Expanded brinks model of international trade of the visegrad four countries in 2000-2015

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Abstract

Interpolation of time series by the sum of exponents of a function of a complex variable makes it possible to obtain a model that is not inferior to the accuracy of regression models . Although time series are interpolated by functions of a complex variable, the sum of these functions, subject to certain conditions, are real numbers. The standard MATHLAB software was used in the calculation process.
The article presents an extended BRINKS model of international trade of the Visegrad Four countries (Czech Republic, Slovakia, Poland, Hungary).
The numerical series characterizing the volume of exports and imports within the Visegrad Four were approximated as the sum of eight exponents, which are functions of a complex variable.

Keywords

BRINKS model of international trade , approximation by functions of a complex variable , international trade

Introduction

International trade is a complex multi-vector process that can have a significant impact on aspects of human activity. Numerous frequent and intergovernmental organizations have been created to regulate international trade relations . The main purpose of which is to establish rules for international trade operations between market participants.

According to [1], the process of globalization of international trade relations requires the authorities controlling international trade to adequately assess the impact of various factors on the process of world trade and to assess the volume of foreign trade.

According to [2], international trade is a form of economic relations that has a significant impact on the development of national economies individually and the global economy as a whole.

The authors [3] note that in modern conditions, the ability to consistently assess the mechanism of international trade is of paramount importance in order to effectively manage this mechanism.

For this purpose, according to [4], the use of various economic and mathematical models of the movement of commodity groups, as well as individual types of goods, deserves attention.

According to [5], effective modeling of international trade makes it possible for interested parties to effectively predict the amount of cash receipts from international trade relations, as well as to assess the impact on international trade of various trade preferences and restrictions.

According to [6], the international trade model can be divided into three main groups Figure 1:

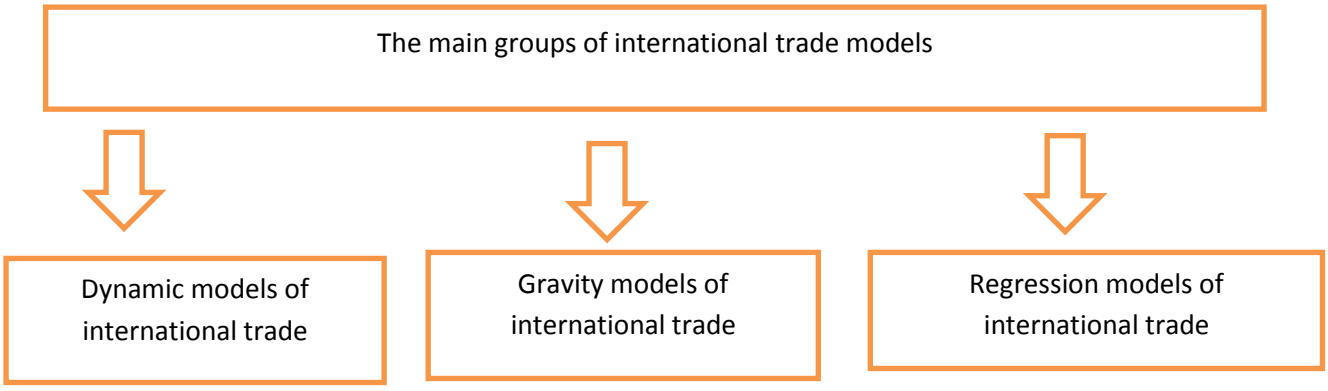

Figure 1 . The main groups of international trade models

According to [7] regression models of international trade estimate in most cases the export or import of a certain group of goods or the total export or import of an entire state.

Regression models model the relationship between certain economic and social indicators of a certain country and its external economic indicators .

Such external economic indicators may include the size of GDP, the volume of exports, the volume of imports, as well as some other parameters.

Gravitational models of international trade are based on the assumption [8] that the volume of international trade depends on the size of these economies and the distance between them.
In our opinion , the definition of the distance between countries should be attributed to the disadvantage of the gravitational model . If we take the distances between countries , that is , the capitals of the states are closely located , for example , Bratislava is the capital of Slovakia and Vienna is the capital of Austria . The distance between them is approximately 80 km.
The distance between Berlin and Beijing in a straight line is 7360 km.
However , a significant part of the trade between Germany and China is carried out by sea . Meanwhile , the distance between Hamburg and Shanghai is 19628 km . . Due to the fact that goods do not always move in a straight line, this makes it difficult to build an adequate gravitational model.
Dynamic models of international trade according to [9 take into account when calculating the volume of foreign economic activity, along with the current macroeconomic parameters, their values in previous time intervals.

Methods

When constructing economic and mathematical models, the interpolation and approximation of logarithmic exponential, power and linear, functions, and polynomials have become widespread. Thus, for convenience and simplicity of calculations, economic phenomena are described in a simplified form.However , such simplifications may reduce the accuracy of the models themselves , which may make it impossible for them to be successfully applied in practice . Regression analysis has become an indispensable tool for the study of economic phenomena . According to the author , the main disadvantage of regression models is the fact that the algorithms for solving these models use the least squares method . Since the least squares method has some disadvantages .Then the calculation of regression models with its help , in some cases , can lead to incorrect results . There is a widespread opinion in the economic literature that many economic values have a pronounced random character . In this regard, the author adheres to the point of view that any randomness is some kind of regularity , and to describe economic phenomena, it is worth using not only indicators of variance and correlation, but more complex mathematical tools. God doesn't play dice with us.

In the book [10] the theorem is formulated

Let's say there is some analytical function of a complex variable . Then this function can be decomposed into a series of exponentials.

(1)

That is, for any convex region there is a sequence of indicators , such that any function analytical in it can be represented as a series that converges uniformly within a region .

Within the framework of this work , a dynamic BRINKS model of international trade of the Visegrad Four countries was built : the Czech Republic , Slovakia , Poland and Hungary for 2000-2015

Results

We will consider the model

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(2)

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(3)

Where , , , , , , , , , , , , , ,

, , , , , , , , , , , , , , ,

some proportionality coefficients that are real numbers

- Electric power consumption (kWh per capita) , - GDP , - Inflation, GDP deflator (annual %) , - Agriculture, forestry, and fishing, value added (% of GDP) , - Industry (including construction), value added (% of GDP) , - Exports of goods and services (% of GDP), - Imports of goods and services (% of GDP) , - Foreign direct investment, net inflows (BoP, current US$)

i = 1,2,3,4 , j =1,2,3,4

In the formulas we use, the Czech Republic will correspond to index =1, Slovakia will correspond to index =2, Poland will correspond to index = 3, Hungary will correspond to index =4.

Within the framework of our models , the year 1999 was chosen as the beginning of the countdown , thus, t(2000)=1 , t(2001)=2 , t(2002)=3 , t(2003)=4 , t(2004)=5 , t(2005)=6, t(2006)=7 , t(2007)=8 , t(2008)=9 , t(2009)=10 , t(2010)=11 , t(2011)=12 , t(2012)=13 , t(2013)=14 , t(2014)=15 , t(2015)=16

Obviously , there are equalities , , ,

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=

To find the proportionality coefficients , , , , , , , , ,

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Let 's make systems of linear equations

$$( )+ * ( )+ * + * + * + * + * + * + * ( )+ * ( )+ * ( )+ * ( )$$

(4)

=

(5)

Numerical series $A_1(1)$, $A_1(2)$,$A_1(3)$,$A_1(4)$,$A_1(5)$,$A_1(6)$,$A_1(7)$,$A_1(8)$, $A_1(9)$,$A_1(10)$,$A_1(11)$,$A_1(12)$, $A_1(13)$,$A_1(14)$,$A_1(15)$,$A_1(16)$ displaying

Electric power consumption (kWh per capita) The Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by the function

$A_1(t)$ =

=(7.78612719260458+4.70975626167684i)*exp((0.152841659394627+2.75406080788682i)*t)+(7.7861271926045-4.70975626167684i)*exp((0.152841659394627-2.75406080788682i)*t)-(2.79772043983012+9.32009135501647i)*exp((0.129530805339664+1.76475718882354i)*t)-(2.79772043983001-9.32009135501664i)*exp((0.129530805339664-1.76475718882354i)*t)+(64.8138240581621-40.7726269397565i)*exp((-0.0204155467480135+0.933603816195829i)*t)+(64.813824058161+40.7726269397603i)*exp((-0.0204155467480135-0.933603816195829i)*t)+(7671.94638581826+1.82931027656561e-11i)*exp((-0.0133388778762827)*t)-(2460.06812602642+4.90459135378476e-12i)*exp((-0.203370005179662)*t)

Really,

Table 1 Electric power consumption (kWh per capital) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $A_1(t)$ 1.0e+03 *
1	5703,8167391	5.7038 + 0.0000i
2	5892,1725955	5.8922 + 0.0000i
3	5894,2331191	5.8942 + 0.0000i
4	6074,8491416	6.0748 + 0.0000i
5	6230,3982279	6.2304 + 0.0000i
6	6357,4210946	6.3574 + 0.0000i
7	6528,5301504	6.5285 + 0.0000i
8	6518,2174127	6.5182 + 0.0000i
9	6489,1262574	6.4891 + 0.0000i
10	6139,3520604	6.1394 + 0.0000i
11	6348,4243981	6.3484 + 0.0000i
12	6298,7276784	6.2987 + 0.0000i
13	6304,571923	6.3046 + 0.0000i
14	6284,7908062	6.2848 + 0.0000i
15	6258,891037	6.2589 + 0.0000i
16	6296,485	6.2965 + 0.0000i

Numerical series $B_1(1)$, $B_1(2)$,$B_1(3)$,$B_1(4)$,$B_1(5)$,$B_1(6)$,$B_1(7)$,$B_1(8)$, $B_1(9)$,$B_1(10)$,$B_1(11)$,$B_1(12)$, $B_1(13)$,$B_1(14)$,$B_1(15)$,$B_1(16)$ the displaying GDP (current US$) of the Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$B_1(t)$ =(-150140951.574766-1.03033953336034e-06i)*exp((0.321355800319115+3.14159265358979i)*t)+(78881197.6248879-122642351.233016i)*exp((0.378658000153029+2.23830611136595i)*t)+(78881197.6248876+122642351.233017i)*exp((0.378658000153029-2.23830611136595i)*t)+(601875871.589039-208103889.224831i)*exp((0.270582133503279 +1.4696418306386i)*t)+(601875871.589041+208103889.224835i)*exp((0.270582133503279- 1.4696418306386i)*t)-(666265260.744316+62698284.9219334i)*exp((0.365201474475659+0.462358316156179i)*t)-(666265260.744317-62698284.9219343i)*exp((0.365201474475659-0.462358316156179i)*t)+(54095932302.0231-1.45749538117056e-05i)*exp((0.143096124979426)*t)

Really,

Table 2 GDP (current US$) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $B_1(t)$ `1.0e+11 *`
1	61828166496	0.6183 - 0.0000i
2	67808032980	0.6781 - 0.0000i
3	82196001051	0.8220 - 0.0000i
4	1,0009046758e+011	1.0009 - 0.0000i
5	1,1981443435e+011	1.1981 - 0.0000i
6	1,3714347133e+011	1.3714 - 0.0000i
7	1,5626409566e+011	1.5626 - 0.0000i
8	1,9018380088e+011	1.9018 + 0.0000i
9	2,3681648576e+011	2.3682 - 0.0000i
10	2,0743429681e+011	2.0743 - 0.0000i
11	2,0906994096e+011	2.0907 - 0.0000i
12	2,295627334e+011	2.2956 + 0.0000i
13	2,0885771932e+011	2.0886 - 0.0000i
14	2,1168561659e+011	2.1169 + 0.0000i
15	2,0935883416e+011	2.0936 - 0.0000i
16	1,8803305046e+011	1.8803 + 0.0000i

Numerical series $C_1(1)$, $C_1(2)$,$C_1(3)$,$C_1(4)$,$C_1(5)$,$C_1(6)$,$C_1(7)$,$C_1(8)$, $C_1(9)$,$C_1(10)$,$C_1(11)$,$C_1(12)$, $C_1(13)$,$C_1(14)$,$C_1(15)$,$C_1(16)$ displaying

Inflation, GDP deflator (annual %) of the Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$C_1(t)$ =-(1.20140345725262e-10+1.98386808009023e-26i)*exp((1.43938329692248+3.14159265358979i)*t)+(2.85233040586517-9.98962963273955e-25i)*exp((-0.0526534489108536)*t)-(0.550304513496066-0.0365077952997151i)*exp((-0.00347858750035675+1.04586861400123i)*t)-(0.550304513496066+0.036507795299713i)*exp((-0.00347858750035675-1.04586861400123i)*t)+(1.29593947978986+0.570434577553598i)*exp((-0.115969881216435+2.37119835199068i)*t)+(1.29593947978986-0.570434577553597i)*exp((-0.115969881216435-2.37119835199068i)*t)-(1.37261805807948+1.16065858801246i)*exp((-0.294700021774782+1.7780985129452i)*t)-(1.37261805807948-1.16065858801246i)*exp((-0.294700021774782-1.7780985129452i)*t)

Really,

Table 3 Inflation, GDP deflator (annual %) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula C_1 (t)
1	1,8421337278	1.8421 + 0.0000i
2	4,8892849577	4.8893 - 0.0000i
3	2,7243493953	2.7243 - 0.0000i
4	1,2927226315	1.2927 - 0.0000i
5	4,049045319	4.0490 + 0.0000i
6	0,094944269676	0.0949 + 0.0000i
7	0,65410532087	0.6541 + 0.0000i
8	3,540381807	3.5404 - 0.0000i
9	2,0095812372	2.0096 - 0.0000i
10	2,5878206809	2.5878 - 0.0000i
11	1.28362436145	1.2836 + 0.0000i
12	-0,020571958	-0.0206 + 0.0000i
13	1,4509210706	1.4509 + 0.0000i
14	1,3647047378	1.3647 + 0.0000i
15	2,5785363157	2.5785 - 0.0000i
16	0,99227616029	0.9923 + 0.0000i

Numerical series $D_1(1)$, $D_1(2)$,$D_1(3)$,$D_1(4)$,$D_1(5)$,$D_1(6)$,$D_1(7)$,$D_1(8)$, $D_1(9)$,$D_1(10)$,$D_1(11)$,$D_1(12)$, $D_1(13)$,$D_1(14)$,$D_1(15)$,$D_1(16)$ displaying

Agriculture, forestry, and fishing, value added (% of GDP) of the Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$D_1(t)$ =(0.000152151249344245-0.000205844284515655i)*exp((0.457159536346256+2.63899417988739i)*t)+(0.000152151249344244+0.000205844284515655i)*exp((0.457159536346256-2.63899417988739i)*t)+(8.59791413095901e-05+3.19666630639398e-20i)*exp((0.649316825754629)*t)-(0.0022894890288376 9-6.14962188692102e-05i)*exp((0.351020845577119+1.20821124740474i)*t)-(0.0022894890288376 9+6.14962188692104e-05i)*exp((0.351020845577119-1.20821124740474i)*t)+(3.25438480571896+2.39877913504183e-16i)*exp((-0.0602688649089454)*t)-(0.429065565609149+0.154633344722559i)*exp((-0.50423652446081+1.57488049947768i)*t)-(0.42906556560915-0.154633344722559i)*exp((-0.50423652446081-1.57488049947768i)*t)

Really,

Table 4 Agriculture, forestry, and fishing, value added (% of GDP) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $D_1(t)$
1	3,2505283308	3.2505 + 0.0000i
2	3,2035270863	3.2035 + 0.0000i
3	2,6595867234	2.6596 - 0.0000i
4	2,4400273141	2.4400 + 0.0000i
5	2,415394613	2.4154 + 0.0000i
6	2,284635292	2.2846 + 0.0000i
7	2,1649554318	2.1650 + 0.0000i
8	2,0889055748	2.0889 + 0.0000i
9	1,9199279718	1.9199 + 0.0000i
10	1,7567875134	1.7568 + 0.0000i
11	1,5405961126	1.5406 + 0.0000i
12	1,9825109919	1.9825 + 0.0000i
13	2,2511856455	2.2512 + 0.0000i
14	2,3647711662	2.3648 + 0.0000i
15	2,4134525421	2.4135 + 0.0000i
16	2,2112138727	2.2112 - 0.0000i

Numerical series $E_1(1)$, $E_1(2)$,$E_1(3)$,$E_1(4)$,$E_1(5)$,$E_1(6)$,$E_1(7)$,$E_1(8)$, $E_1(9)$,$E_1(10)$,$E_1(11)$,$E_1(12)$, $E_1(13)$,$E_1(14)$,$E_1(15)$,$E_1(16)$ displaying

Industry (including construction), value added (% of GDP) of the Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$E_1(t)$=(0.0031002783363823-0.0134674244160298i)*exp((0.238317620222768+1.71226707952761i)*t)+(0.0031002783363821 6+0.0134674244160299i)*exp((0.238317620222768-1.71226707952761i)*t)+(34.2329974108156+6.77117096266252e-15i)*exp((-0.00231035440053332)*t)+(1.48934996767239-0.592853487695893i)*exp((-0.231959825507512+0.885933439791479i)*t)+(1.48934996767239+0.592853487695893i)*exp((-0.231959825507512-0.885933439791479i)*t)+(0.338368758196874-0.566367287100472i)*exp((-0.292142772942596+2.74476619138222i)*t)+(0.338368758196873+0.566367287100472i)*exp((-0.292142772942596-2.74476619138222i)*t)-(24.5029907651917-2.01906933254954e-15i)*exp((-2.17679399176391)*t)

Really,

Table 5 Industry (including construction), value added (% of GDP) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $E_1(t)$
1	33,491207477	33.4912 + 0.0000i
2	33,909200248	33.9092 + 0.0000i
3	33,209289397	33.2093 + 0.0000i
4	32,342253383	32.3423 + 0.0000i
5	33,579749591	33.5797 + 0.0000i
6	33,617198193	33.6172 + 0.0000i
7	34,333215988	34.3332 + 0.0000i
8	34,182736616	34.1827 + 0.0000i
9	33,657633458	33.6576 + 0.0000i
10	32,987694471	32.9877 + 0.0000i
11	33,170751865	33.1708 + 0.0000i
12	33,650573822	33.6506 + 0.0000i
13	32,922327504	32.9223 + 0.0000i
14	32,646070506	32.6461 + 0.0000i
15	33,839350761	33.8394 + 0.0000i
16	33,781822805	33.7818 + 0.0000i

Numerical series $F_1(1)$, $F_1(2)$,$F_1(3)$,$F_1(4)$,$F_1(5)$,$F_1(6)$,$F_1(7)$,$F_1(8)$, $F_1(9)$,$F_1(10)$,$F_1(11)$,$F_1(12)$, $F_1(13)$,$F_1(14)$,$F_1(15)$,$F_1(16)$ displaying

Exports of goods and services (% of GDP) of the Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$F_1(t)$=-(0.0956805897053229+2.11282139042447e-16i)*exp((0.190251762722819+3.14159265358979i)*t)-(1.04386952201647-1.08731148208651i)*exp((-0.0701552803990823+1.96234196490231i)*t)-(1.04386952201646+1.08731148208651i)*exp((-0.0701552803990823-1.96234196490231i)*t)+(46.682890336426-1.14316606376001e-15i)*exp((0.03469678192828)*t)+(2.7734628294889+2.25234591161121i)*exp((-0.0401706623847242+0.813908901098639i)*t)+(2.7734628294889-2.25234591161125i)*exp((-0.0401706623847242-0.813908901098639i)*t)-(0.237036628671258+0.206580250975371i)*exp((0.109411907636217+1.23712715910722i)*t)-(0.237036628671257-0.206580250975369i)*exp((0.109411907636217-1.23712715910722i)*t)

Really,

Table 6 .Exports of goods and services (% of GDP) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $F_1(t)$
1	48,090989817	48.0910 - 0.0000i
2	48,856511857	48.8565 - 0.0000i
3	45,004128604	45.0041 + 0.0000i
4	46,728047794	46.7280 + 0.0000i
5	57,057839892	57.0578 + 0.0000i
6	61,813226865	61.8132 + 0.0000i
7	64,875423442	64.8754 - 0.0000i
8	66,100769186	66.1008 - 0.0000i
9	62,951648091	62.9516 - 0.0000i
10	58,345429808	58.3454 + 0.0000i
11	65,543005407	65.5430 - 0.0000i
12	70,821867193	70.8219 + 0.0000i
13	75,646186565	75.6462 - 0.0000i
14	76,058381616	76.0584 + 0.0000i
15	81,954274574	81.9543 - 0.0000i
16	80,558778115	80.5588 + 0.0000i

Numerical series $G_1(1)$, $G_1(2)$,$G_1(3)$,$G_1(4)$,$G_1(5)$,$G_1(6)$,$G_1(7)$,$G_1(8)$, $G_1(9)$,$G_1(10)$,$G_1(11)$,$G_1(12)$, $G_1(13)$,$G_1(14)$,$G_1(15)$,$G_1(16)$ displaying

Imports of goods and services (% of GDP) of the Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$G_1(t)$ =(7.92839613210653e-10+1.05618190435042e-24i)*exp((1.46055077933491+3.14159265358979i)*t)-(0.0669932854855825+6.37719884761979e-17i)*exp((0.260271949529176+3.14159265358979i)*t)-(0.69259127381622-0.0552714537176706i)*exp((0.059793923936821+1.89118173134574i)*t)-(0.69259127381622+0.0552714537176733i)*exp((0.059793923936821-1.89118173134574i)*t)+(2.58946420215871-0.644652952508133i)*exp((-0.0069771663726912 2+0.944849647595646i)*t)+(2.58946420215874+0.644652952508187i)*exp((-0.00697716637269122-0.944849647595646i)*t)+(49.7273376254171+8.04004785861848e-15i)*exp((0.0232606647463282)*t)+(-10.693859356789+2.86213321700228e-14i)*exp((-0.677447333810914)*t)

Really,

Table 7 Imports of goods and services (% of GDP) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $G_1(t)$
1	49,95534908	49.9553 + 0.0000i
2	50,155944301	50.1559 - 0.0000i
3	46,33052172	46.3305 - 0.0000i
4	48,245481064	48.2455 - 0.0000i
5	56,43112009	56.4311 + 0.0000i
6	59,484733539	59.4847 + 0.0000i
7	62,152958426	62.1530 + 0.0000i
8	63,67824812	63.6782 + 0.0000i
9	60,790851031	60.7909 - 0.0000i
10	54,451814724	54.4518 - 0.0000i
11	62,485906128	62.4859 - 0.0000i
12	67,040951692	67.0410 + 0.0000i
13	70,882670011	70.8827 - 0.0000i
14	70,364035434	70.3640 + 0.0000i
15	75,620707604	75.6207 - 0.0000i
16	74,616885366	74.6169 - 0.0000i

Numerical series $H_1(1)$, $H_1(2)$,$H_1(3)$,$H_1(4)$,$H_1(5)$,$H_1(6)$,$H_1(7)$,$H_1(8)$, $H_1(9)$,$H_1(10)$,$H_1(11)$,$H_1(12)$, $H_1(13)$,$H_1(14)$,$H_1(15)$,$H_1(16)$ displaying

Foreign direct investment, net inflows (BoP, current US$) of the Czech Republic in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$H_1(t)$=(-250120.489233+2.23082050923533e-09i)*exp((0.62828002676113+3.14159265358979i)*t)-(256380786.657167-5.48299012636106e-06i)*exp((0.211058730641109)*t)+(8251406926.7671-0.000233528480042848i)*exp((0.026555649942732 2)*t)+(3606856130.54778+213247743.816438i)*exp((-0.135677168058349+0.848815109836271i)*t)+(3606856130.54777-213247743.816428i)*exp((-0.135677168058349-0.848815109836271i)*t)+(1609499659.65008-3398542562.82462i)*exp((-0.0787813466328606+2.40460738611988i)*t)+(1609499659.65009+3398542562.82462i)*exp((-0.0787813466328606-2.40460738611988i)*t)+(21308484773.1595-3.8367462088496e-05i)*exp((-0.85389785921231+3.14159265358979i)*t)

Really,

Table 8 Foreign direct investment, net inflows (BoP, current US$) of the Czech Republic in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $H_1(t)$ 1.0e+10 *
1	4987079129,3	0.4987 - 0.0000i
2	5640707235,9	0.5641 - 0.0000i
3	8496609035,8	0.8497 - 0.0000i
4	2021275746	0.2021 - 0.0000i
5	6423465150,8	0.6423 - 0.0000i
6	13730164683	1.3730 - 0.0000i
7	7132002407,7	0.7132 - 0.0000i
8	13815656004	1.3816 - 0.0000i
9	8815393022,1	0.8815 - 0.0000i
10	5271613701,8	0.5272 - 0.0000i
11	10167834375	1.0168 - 0.0000i
12	4188736491,3	0.4189 - 0.0000i
13	9433199804,8	0.9433 - 0.0000i
14	7357578652,6	0.7358 - 0.0000i
15	8088661929,9	0.8089 - 0.0000i
16	1699914616,6	0.1700 + 0.0000i

Numerical series $A_4(1)$, $A_4(2)$,$A_4(3)$,$A_4(4)$,$A_4(5)$,$A_4(6)$,$A_4(7)$,$A_4(8)$, $A_4(9)$,$A_4(10)$,$A_4(11)$,$A_4(12)$, $A_4(13)$,$A_4(14)$,$A_4(15)$,$A_4(16)$ displaying

Electric power consumption (kWh per capital) of Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$A_4(t)$ = -(7.94002462332461e-10+4.19962448567572e-24i)*exp((1.81637462764201+3.14159265358979i)*t)+(7.96232265894133e-06+1.70149378449525e-20i)*exp((1.25818458437635)*t)-(0.476608638145515-0.0677114358865757i)*exp((0.41194215194218+2.52259692486949i)*t)-(0.476608638145518+0.0677114358865792i)*exp((0.41194215194218-2.52259692486949i)*t)-(3.24205839165425-3.53773648723045i)*exp((0.25092646081822+1.29793403511172i)*t) -(3.24205839165425+3.53773648723046i)*exp((0.25092646081822-1.29793403511172i)*t)-(107.654979474644+1.67203826425828e-13i)*exp((0.220263418921143)*t)+(3320.82630642436+4.60907671124686e-12i)*exp((0.0391498916244992)*t)

Really,

Table 9 Electric power consumption (kWh per capital) of Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $A_4(t)$ 1.0e+03 *
1	3309,2837106	3.3093 + 0.0000i
2	3426,7229025	3.4267 + 0.0000i
3	3545,1707557	3.5452 + 0.0000i
4	3637,2783318	3.6373 + 0.0000i
5	3680,1684669	3.6802 + 0.0000i
6	3771,364614	3.7714 + 0.0000i
7	3882,4906641	3.8825 + 0.0000i
8	3976,5189771	3.9765 + 0.0000i
9	3988,7676939	3.9888 + 0.0000i
10	3773,1538066	3.7732 + 0.0000i
11	3876,4910841	3.8765 + 0.0000i
12	3898,8231427	3.8988 + 0.0000i
13	3923,0423245	3.9230 + 0.0000i
14	3892,1137013	3.8921 + 0.0000i
15	3965,9582335	3.9660 - 0.0000i
16	3966,865	3.9669 + 0.0000i

Numerical series $B_4(1)$, $B_4(2)$,$B_4(3)$,$B_4(4)$,$B_4(5)$,$B_4(6)$,$B_4(7)$,$B_4(8)$, $B_4(9)$,$B_4(10)$,$B_4(11)$,$B_4(12)$, $B_4(13)$,$B_4(14)$,$B_4(15)$,$B_4(16)$ displaying

GDP (current US$) Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$B_4(t)$ =-(0.0154687950571196-0.00101512730309711i)*exp((0.208595133145739+2.25020415440389i)*t)-(0.0154687950571198+0.00101512730309752i)*exp((0.208595133145739-2.25020415440389i)*t)+(0.397225797654156+1.67745502217277i)*exp((-0.232461537455828+2.21171511252057i)*t)+(0.397225797654169-1.67745502217279i)*exp((-0.232461537455828-2.21171511252057i)*t)-(1.30626855904106+0.0750268051561453i)*exp((-0.0740119195209523+1.05800144077589i)*t)-(1.30626855904106-0.0750268051561445i)*exp((-0.0740119195209523-1.05800144077589i)*t)+(7.27177982768587-2.84899363833774e-16i)*exp((-0.0710621593435267)*t)+(25.834399952854-2.93534906372888e-15i)*exp((-1.40085528009881)*t)

Really,

Table 10 GDP (current US$) Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $B_4(t)$ 1.0e+11 *
1	47218405892	0.4722 - 0.0000i
2	53749989092	0.5375 - 0.0000i
3	67608919144	0.6761 - 0.0000i
4	85302003908	0.8530 - 0.0000i
5	1,0414104263e+011	1.0414 - 0.0000i
6	1,1323671164e+011	1.1324 - 0.0000i
7	1,157512667e+011	1.1575 - 0.0000i
8	1,4022756062e+011	1.4023 - 0.0000i
9	1,5837441964e+011	1.5837 - 0.0000i
10	1,3111422905e+011	1.3111 - 0.0000i
11	1,3223113416e+011	1.3223 - 0.0000i
12	1,4199996021e+011	1.4200 - 0.0000i
13	1,2885737048e+011	1.2886 - 0.0000i
14	1,3573259572e+011	1.3573 + 0.0000i
15	1,4107898482e+011	1.4108 - 0.0000i
16	1,2521032461e+011	1.2521 + 0.0000i

Numerical series $C_4(1)$, $C_4(2)$,$C_4(3)$,$C_4(4)$,$C_4(5)$,$C_4(6)$,$C_4(7)$,$C_4(8)$, $C_4(9)$,$C_4(10)$,$C_4(11)$,$C_4(12)$, $C_4(13)$,$C_4(14)$,$C_4(15)$,$C_4(16)$ displaying

Inflation, GDP deflator (annual %) of Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$C_4(t)$ =-(0.0154687950571196-0.00101512730309711i)*exp((0.208595133145739+2.25020415440389i)*t)-(0.0154687950571198+0.00101512730309752i)*exp((0.208595133145739-2.25020415440389i)*t)+(0.397225797654156+1.67745502217277i)*exp((-0.232461537455828+2.21171511252057i)*t)+(0.397225797654169-1.67745502217279i)*exp((-0.232461537455828-2.21171511252057i)*t)-(1.30626855904106+0.0750268051561453i)*exp((-0.0740119195209523+1.05800144077589i)*t)-(1.30626855904106-0.0750268051561445i)*exp((-0.0740119195209523-1.05800144077589i)*t)+(7.27177982768587-2.84899363833774e-16i)*exp((-0.0710621593435267)*t)+(25.834399952854-2.93534906372888e-15i)*exp((-1.40085528009881)*t)

Really,

Table 11 Inflation, GDP deflator (annual %) of Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula C_4 (t)
1	9,5834818848	9.5835 + 0.0000i
2	11,046560272	11.0466 + 0.0000i
3	8,0915105951	8.0915 - 0.0000i
4	5,4439806828	5.4440 + 0.0000i
5	5,0947822066	5.0948 + 0.0000i
6	2,6292775446	2.6293 - 0.0000i
7	3,6635226666	3.6635 + 0.0000i
8	5,4423277395	5.4423 - 0.0000i
9	4,8052931064	4.8053 - 0.0000i
10	4,2000270758	4.2000 + 0.0000i
11	2,533695914	2.5337 - 0.0000i
12	1,9338207051	1.9338 + 0.0000i
13	2,8932006013	2.8932 + 0.0000i
14	2,8188415169	2.8188 - 0.0000i
15	3,6974611273	3.6975 + 0.0000i
16	2,776554175	2.7766 - 0.0000i

Numerical series $D_4(1)$, $D_4(2)$,$D_4(3)$,$D_4(4)$,$D_4(5)$,$D_4(6)$,$D_4(7)$,$D_4(8)$, $D_4(9)$,$D_4(10)$,$D_4(11)$,$D_4(12)$, $D_4(13)$,$D_4(14)$,$D_4(15)$,$D_4(16)$ displaying

Agriculture, forestry, and fishing, value added (% of GDP) Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$D_4(t)$= (0.077077307002881-0.0305849418209424i)*exp ((-0.0182024079012418 +2.64967088611098i)*t)+(0.0770773070028802+0.0305849418209448i)*exp((-0.0182024079012418-2.64967088611098i)*t)-(0.12365377100639+0.00304363724410722i)*exp((0.000580664329778681+1.80447863406512i)*t)-(0.123653771006362-0.00304363724410222i)*exp((0.000580664329778681-1.80447863406512i)*t)+(0.00592684533521899+0.0036754831745247i)*exp((0.266425308186796+0.927798804430782i)*t)+(0.00592684533521898-0.0036754831745247i)*exp((0.266425308186796-0.927798804430782i)*t)+(0.0544143839346727-4.07725063380403e-18i)*exp((0.245290438792003)*t)+(5.23999441600031+7.22095978036854e-16i)*exp((-0.0660348568144216)*t)

Really,

Table 12 Agriculture, forestry, and fishing, value added (% of GDP) Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $D_4(t)$
1	4,9344598775	4.9345 - 0.0000i
2	4,914388877	4.9144 + 0.0000i
3	4,2607950426	4.2608 + 0.0000i
4	3,9010994726	3.9011 - 0.0000i
5	4,3515633277	4.3516 - 0.0000i
6	3,7205466568	3.7205 + 0.0000i
7	3,5345223029	3.5345 - 0.0000i
8	3,4855416814	3.4855 - 0.0000i
9	3,4519044884	3.4519 + 0.0000i
10	3,0553968665	3.0554 + 0.0000i
11	3,032888355	3.0329 - 0.0000i
12	3,9936143865	3.9936 - 0.0000i
13	3,8897887499	3.8898 + 0.0000i
14	3,9156922228	3.9157 - 0.0000i
15	3,9347824318	3.9348 - 0.0000i
16	3,7884693126	3.7885 + 0.0000i

Numerical series $E_4(1)$, $E_4(2)$,$E_4(3)$,$E_4(4)$,$E_4(5)$,$E_4(6)$,$E_4(7)$,$E_4(8)$, $E_4(9)$,$E_4(10)$,$E_4(11)$,$E_4(12)$, $E_4(13)$,$E_4(14)$,$E_4(15)$,$E_4(16)$ displaying

Industry (including construction), value added (% of GDP) Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$E_4(t)$ = -(0.0102856901176912+2.88207501543051e-16i)*exp((0.0983992218757528+3.14159265358979i)*t)+(0.0629228034605663+0.0921047410836876i)*exp((-0.120277323775487+2.16471462026486i)*t)+(0.0629228034605573-0.09210474108368i)*exp((-0.120277323775487-2.16471462026486i)*t)-(0.0649011265992355+0.0740773558148751i)*exp((0.0620370097036231+1.25684586370935i)*t)-(0.0649011265992359-0.0740773558148732i)*exp((0.0620370097036231-1.25684586370935i)*t)-(0.0297253646571456-0.162364741968099i)*exp((0.083781808197238+0.676911288329977i)*t)-(0.029725364657146+0.162364741968097i)*exp((0.083781808197238-0.676911288329977i)*t)+(27.574078949215-5.11798623757114e-14i)*exp((-0.00635856499498368)*t)

Really,

Table 13 Industry (including construction), value added (% of GDP) Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $E_4(t)$
1	27,048550996	27.0486 - 0.0000i
2	27,137829817	27.1378 - 0.0000i
3	26,807025341	26.8070 - 0.0000i
4	26,383802997	26.3838 - 0.0000i
5	26,845397915	26.8454 - 0.0000i
6	27,175641876	27.1756 - 0.0000i
7	27,183479395	27.1835 - 0.0000i
8	26,694193006	26.6942 - 0.0000i
9	25,753130858	25.7531 - 0.0000i
10	25,080742933	25.0807 - 0.0000i
11	25,189272761	25.1893 - 0.0000i
12	25,093904329	25.0939 - 0.0000i
13	25,009833198	25.0098 - 0.0000i
14	25,040168525	25.0402 - 0.0000i
15	25,682318567	25.6823 - 0.0000i
16	26,375612421	26.3756 - 0.0000i

Numerical series $F_4(1)$, $F_4(2)$,$F_4(3)$,$F_4(4)$,$F_4(5)$,$F_4(6)$,$F_4(7)$,$F_4(8)$, $F_4(9)$,$F_4(10)$,$F_4(11)$,$F_4(12)$, $F_4(13)$,$F_4(14)$,$F_4(15)$,$F_4(16)$ o displaying

Exports of goods and services (% of GDP) Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$F_4(t)$ =(0.457467302758846-0.341046823383655i)*exp((0.0247488051805186+2.82429739966405i)*t)+(0.457467302758836+0.34104682338368i)*exp((0.0247488051805186-2.82429739966405i)*t)+(0.583446874295298-0.531875831314344i)*exp((0.0553128727419325+1.64429522440445i)*t)+(0.583446874295304+0.531875831314353i)*exp((0.0553128727419325-1.64429522440445i)*t)-(0.0357052524705041-3.69805841135104e-17i)*exp((0.40948577462871)*t)+(51.0373113891532-1.38597651107828e-14i)*exp((0.0466466088382818)*t)+(1.49835384830684-8.61426885025374i)*exp((-0.19752195124992+0.974170070789822i)*t)+(1.49835384830682+8.614268850253372i)*exp((-0.19752195124992-0.974170070789822i)*t)

Really,

Table 14 Exports of goods and services (% of GDP) Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $F_4(t)$
1	66,857889777	66.8579 - 0.0000i
2	64,877320813	64.8773 + 0.0000i
3	58,136973575	58.1370 + 0.0000i
4	56,333158094	56.3332 - 0.0000i
5	59,550692973	59.5507 - 0.0000i
6	62,501087386	62.5011 - 0.0000i
7	73,757866052	73.7579 + 0.0000i
8	77,796898397	77.7969 - 0.0000i
9	79,156518092	79.1565 + 0.0000i
10	74,198793843	74.1988 - 0.0000i
11	81,073087589	81.0731 + 0.0000i
12	86,042722818	86.0427 - 0.0000i
13	85,850682046	85.8507 - 0.0000i
14	85,380441919	85.3804 - 0.0000i
15	87,095589554	87.0956 - 0.0000i
16	87,501175472	87.5012 + 0.0000i

Numerical series $G_4(1)$, $G_4(2)$,$G_4(3)$,$G_4(4)$,$G_4(5)$,$G_4(6)$,$G_4(7)$,$G_4(8)$, $G_4(9)$,$G_4(10)$,$G_4(11)$,$G_4(12)$, $G_4(13)$,$G_4(14)$,$G_4(15)$,$G_4(16)$ displaying

Imports of goods and services (% of GDP) Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

G4(t) =-(2.35387813853944e-06+1.32882255682025e-21i)*exp((0.989562674937461)*t)+(0.588370955924366-0.293779376039769i)*exp((0.0416669827624498+2.81153590798713i)*t)+(0.588370955924373+0.293779376039781i)*exp((0.0416669827624498-2.81153590798713i)*t)+(0.376648967655366-0.37275421606748i)*exp((0.107710161601541+1.63917811823735i)*t)+(0.376648967655364+0.372754216067473i)*exp((0.107710161601541-1.63917811823735i)*t)+(59.7479628210976+2.13435894947975e-14i)*exp((0.0243804486486528)*t)+(4.46067548565854-3.20548166616744i)*exp((-0.113130568258627+0.868373726615539i)*t)+(4.46067548565856+3.20548166616743i)*exp((-0.113130568258627-0.868373726615539i)*t)

Really,

Table 15 Imports of goods and services (% of GDP) Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $G_4(t)$
1	70,548711458	70.5487 - 0.0000i
2	66,167747927	66.1677 + 0.0000i
3	60,183135587	60.1831 + 0.0000i
4	60,273016181	60.2730 + 0.0000i
5	63,871641774	63.8716 + 0.0000i
6	65,283158908	65.2832 + 0.0000i
7	75,204880041	75.2049 + 0.0000i
8	77,656060153	77.6561 - 0.0000i
9	79,119989828	79.1200 + 0.0000i
10	70,751367251	70.7514 + 0.0000i
11	76,325396658	76.3254 + 0.0000i
12	80,322837265	80.3228 + 0.0000i
13	79,742591367	79.7426 + 0.0000i
14	78,9072106	78.9072 + 0.0000i
15	81,245125164	81.2451 - 0.0000i
16	79,770951585	79.7710 + 0.0000i

Numerical series $H_4(1)$, $H_4(2)$,$H_4(3)$,$H_4(4)$,$H_4(5)$,$H_4(6)$,$H_4(7)$,$H_4(8)$, $H_4(9)$,$H_4(10)$,$H_4(11)$,$H_4(12)$, $H_4(13)$,$H_4(14)$,$H_4(15)$,$H_4(16)$ displaying

Foreign direct investment, net inflows (BoP, current US$) Hungary in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$H_4(t)$=-(3429683355.06995+1319861381.38462i)*exp((0.0774608870605486+2.560722088815949i)*t)-(3429683355.06995-

1319861381.3846i)*exp((0.0774608870605486-2.56072208815949i)*t)-(2705125067.44538-1287973405.60335i)*exp((0.0488069899890934+1.92765670786601i)*t)-(2705125067.44538+1287973405.60337i)*exp((0.0488069899890934-1.92765670786601i)*t)+(6128746.15292883-4303366758.8811i)*exp((0.086786174184468 9+0.889047371598057i)*t)+(6128746.15291524+4303366758.88111i)*exp((0.086786174184468 9-0.889047371598057i)*t)-(7706931899.17251+7815577325.63223i)*exp((0.093814917617719 2+0.268866996816291i)*t)-(7706931899.17253-7815577325.63222i)*exp((0.093814917617719 2-0.268866996816291i)*t)

Really,

Table 16 Foreign direct investment, net inflows (BoP, current US$) Hungary in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $H_4(t)$ 1.0e+10 *
1	2747712559,8	0.2748 + 0.0000i
2	4058819560,7	0.4059 + 0.0000i
3	3643428379,5	0.3643 - 0.0000i
4	4157510420,3	0.4158 + 0.0000i
5	4538099567,2	0.4538 + 0.0000i
6	27489690204	2.7490 + 0.0000i
7	18678720025	1.8679 + 0.0000i
8	70631297039	7.0631 + 0.0000i
9	75107772943	7.5108 + 0.0000i
10	42924369747	4.2924 - 0.0000i
11	62824164246	6.2824 + 0.0000i
12	10740966551	1.0741 - 0.0000i
13	10815928328	1.0816 - 0.0000i
14	5414494216	0.5414 + 0.0000i
15	13060104659	1.3060 + 0.0000i
16	13090504751	1.3091 + 0.0000i

Numerical series $A_3(1)$, $A_3(2)$,$A_3(3)$,$A_3(4)$,$A_3(5)$,$A_3(6)$,$A_3(7)$,$A_3(8)$, $A_3(9)$,$A_3(10)$,$A_3(11)$, $A_3(12)$, $A_3(13)$, $A_3(14)$, $A_3(15)$,$A_3(16)$ displaying

Electric power consumption (kWh per capital) of Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$A_3(t)$ =-(0.000121746366920893-7.11368798151198e-20i)*exp((0.936093716472548)*t)+(7.76985331424822+1.34602318253806i)*exp((0.10854631856525+2.77226905567163i)*t)+(7.76985331424832-

1.34602318253799i)*exp((0.10854631856525-2.77226905567163i)*t)-(1.33484440540635+16.0641872581838i)*exp((0.0679406023006235+1.73286491379525i)*t)-(1.33484440540632-16.0641872581839i)*exp((0.0679406023006235-1.73286491379525i)*t)+(3123.12013032711-8.15591108508682e-14i)*exp((0.0178023331768892)*t)+(29.2737126506709-16.577418113097i)*exp((-0.0362961457904076+0.913672564534314i)*t)+(29.2737126506706+16.5774181130968i)*exp((-0.0362961457904076-0.913672564534314i)*t)

Really,

Table 17 Electric power consumption (kWh per capital) of Poland in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $A_3(t)$ 1.0e+03 *
1	3256,1804554	3.2562 - 0.0000i
2	3260,0332628	3.2600 + 0.0000i
3	3208,3921566	3.2084 + 0.0000i
4	3324,4713918	3.3245 + 0.0000i
5	3416,1186324	3.4161 - 0.0000i
6	3437,3239982	3.4373 - 0.0000i
7	3584,9621881	3.5850 - 0.0000i
8	3661,6461038	3.6616 - 0.0000i
9	3725,7487779	3.7257 + 0.0000i
10	3590,8320812	3.5908 - 0.0000i
11	3797,0922956	3.7971 + 0.0000i
12	3879,5420938	3.8795 - 0.0000i
13	3899,1766423	3.8992 - 0.0000i
14	3938,2552077	3.9383 - 0.0000i
15	3971,7997613	3.9718 + 0.0000i
16	3897,457	3.8975 + 0.0000i

Numerical series $B_3(1)$, $B_3(2)$,$B_3(3)$,$B_3(4)$,$B_3(5)$,$B_3(6)$,$B_3(7)$,$B_3(8)$, $B_3(9)$,$B_3(10)$,$B_3(11)$, $B_3(12)$, $B_3(13)$, $B_3(14)$, $B_3(15)$,$B_3(16)$ displaying

GDP (current US$) Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$B_3(t)$ =-(2.32331613593925-2.33419960945125e-15i)*exp((1.70489020898674)*t)-(124587574.786216-131709666.371693i)*exp((0.441677984649838+2.59065140734652i)*t)-(124587574.786217+131709666.371693i)*exp((0.441677984649838-

2.59065140734652i)*t)-(726187646.8293-
275169893.8215i)*exp((0.349366371470773+1.83117932996958i)*t)-
(726187646.8293+275169893.821498i)*exp((0.349366371470773-
1.83117932996958i)*t)+(2942742215.98241+471053208.81508i)*exp((0.269188
856125679+0.746031692704147i)*t)+(2942742215.98241-
471053208.815082i)*exp((0.269188856125679-
0.746031692704147i)*t)+(148978049218.714-1.34942962354235e-
05i)*exp((0.117227405861554)*t)

Really,

Table 18 GDP (current US$) Poland in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $B_3(t)$ 1.0e+11 *
1	1,7221946113e+011	1.7222 - 0.0000i
2	1,9090549354e+011	1.9091 - 0.0000i
3	1,9907205882e+011	1.9907 - 0.0000i
4	2,1782726081e+011	2.1783 - 0.0000i
5	2,5511018154e+011	2.5511 - 0.0000i
6	3,0614433627e+011	3.0614 - 0.0000i
7	3,4462200309e+011	3.4462 - 0.0000i
8	4,2902850537e+011	4.2903 - 0.0000i
9	5,3360908185e+011	5.3361 - 0.0000i
10	4,3973750841e+011	4.3974 + 0.0000i
11	4,7983417902e+011	4.7983 - 0.0000i
12	5,2830126907e+011	5.2830 - 0.0000i
13	4,9852356825e+011	4.9852 + 0.0000i
14	5,2101626273e+011	5.2102 - 0.0000i
15	5,4247709621e+011	5.4248 + 0.0000i
16	4,7781191139e+011	4.7781 + 0.0000i

Numerical series $C_3(1)$, $C_3(2)$,$C_3(3)$,$C_3(4)$,$C_3(5)$,$C_3(6)$,$C_3(7)$,$C_3(8)$, $C_3(9)$,$C_3(10)$,$C_3(11)$, $C_3(12)$, $C_3(13)$, $C_3(14)$, $C_3(15)$,$C_3(16)$ displaying

Inflation, GDP deflator (annual %) of Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$C_3(t)$ =(0.305803050364477-0.639419457780318i)*exp((-
0.0730408750438177+2.63062243928636i)*t)+(0.305803050364477+0.63941945
7780318i)*exp((-0.0730408750438177-2.63062243928636i)*t)-
(0.01390500272181-

0.0411873249768821i)*exp((0.225271188966421+0.521941453971253i)*t)-(0.0139050027218101+0.0411873249768821i)*exp((0.225271188966421-0.521941453971253i)*t)-(0.858922522548172+0.782805976501959i)*exp((-0.0818573306969198+1.68198816058475i)*t)-(0.858922522548171-0.78280597650196i)*exp((-0.0818573306969198-1.68198816058475i)*t)+(2.46402822413578+1.11582739709676e-15i)*exp((0.0138617223026608)*t)+(15.6942693974118-2.96594669260935e-16i)*exp((-2.05424928995982)*t)

Really,

Table 19 Inflation, GDP deflator (annual %) of Poland in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula C_3 (t)
1	6,1233217512	6.1233 + 0.0000i
2	3,1198610944	3.1199 + 0.0000i
3	1,850183388	1.8502 + 0.0000i
4	0,77603080012	0.7760 + 0.0000i
5	4,9166469619	4.9166 + 0.0000i
6	2,5591805303	2.5592 + 0.0000i
7	1,7284234987	1.7284 + 0.0000i
8	3,7170784662	3.7171 + 0.0000i
9	3,8943510974	3.8944 - 0.0000i
10	3,7855576881	3.7856 + 0.0000i
11	1,6509067194	1.6509 + 0.0000i
12	3,2705748198	3.2706 + 0.0000i
13	2,3614948439	2.3615 + 0.0000i
14	0,30491741102	0.3049 + 0.0000i
15	0,52186872818	0.5219 + 0.0000i
16	0,97402825079	0.9740 + 0.0000i

Numerical series $D_3(1)$, $D_3(2)$,$D_3(3)$,$D_3(4)$,$D_3(5)$,$D_3(6)$,$D_3(7)$,$D_3(8)$, $D_3(9)$,$D_3(10)$,$D_3(11)$, $D_3(12)$, $D_3(13)$, $D_3(14)$, $D_3(15)$,$D_3(16)$ displaying

Agriculture, forestry, and fishing, value added (% of GDP) Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$D_3(t)$ =-(0.0309592387459963+0.0285330860886963i)*exp((-0.0092379493949273 4+2.75791564186567i)*t)-(0.0309592387459977-0.0285330860887004i)*exp((-0.0092379493949273 4-2.75791564186567i)*t)-(0.171349194082972-0.18503911063287i)*exp((-

0.0956261264661008+2.01035136573593i)*t)-(0.171349194082972+0.185039110632869i)*exp((-0.0956261264661008-2.01035136573593i)*t)+(0.0162430149975302+0.0403479141360129i)*exp((0.0847509035770768+0.87601941213403i)*t)+(0.0162430149975302-0.0403479141360128i)*exp((0.0847509035770768-0.87601941213403i)*t)+(2.84929649867891-6.53161958179432e-14i)*exp((-0.000535130816624387)*t)+(0.99724259326157+4.2088835141951e-15i)*exp((-0.87056682081765)*t)

Really,

Table 20 Agriculture, forestry, and fishing, value added (% of GDP) Poland in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula D_3 (t)
1	3,1267243211	3.1267 - 0.0000i
2	3,2534150174	3.2534 - 0.0000i
3	2,7257594673	2.7258 - 0.0000i
4	2,6098031994	2.6098 - 0.0000i
5	3,2926049013	3.2926 - 0.0000i
6	2,9189423844	2.9189 - 0.0000i
7	2,6919922837	2.6920 - 0.0000i
8	3,0455373774	3.0455 - 0.0000i
9	2,5926222667	2.5926 - 0.0000i
10	2,5589183871	2.5589 - 0.0000i
11	2,8577372543	2.8577 - 0.0000i
12	3,0850643124	3.0851 - 0.0000i
13	2,9143634328	2.9144 - 0.0000i
14	3,0911676759	3.0912 - 0.0000i
15	2,848161922	2.8482 - 0.0000i
16	2,3746441088	2.3746 - 0.0000i

Numerical series $E_3(1)$, $E_3(2)$,$E_3(3)$,$E_3(4)$,$E_3(5)$,$E_3(6)$,$E_3(7)$,$E_3(8)$, $E_3(9)$,$E_3(10)$,$E_3(11)$, $E_3(12)$, $E_3(13)$, $E_3(14)$, $E_3(15)$,$E_3(16)$ displaying

Industry (including construction), value added (% of GDP) Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

E_3(t)=-(4.90701376805993e-07+8.43525983247033e-07i)*exp((0.902920309415206+1.234739533018i)*t)-(4.90701376805991e-07-8.43525983247019e-07i)*exp((0.902920309415206-1.234739533018i)*t)+(0.0393624997750518+0.0144424802843702i)*exp((0.151

696939954383+2.49502564339402i)*t)+(0.0393624997750516-0.0144424802843701i)*exp((0.151696939954383-2.49502564339402i)*t)+(28.8906853140472-1.06061765217406e-12i)*exp((0.00157740347437451)*t)-(2.70462253444315+4.68683940729481e-14i)*exp((-0.228326474952231)*t)+(0.79372600550915-1.31901165841927i)*exp((-0.348620916558552+1.28332303428571i)*t)+(0.793726005509159+1.31901165841927i)*exp((-0.348620916558552-1.28332303428571i)*t)

Really,

Table 21 Industry (including construction), value added (% of GDP) Poland in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula E_3 (t)
1	28,793172323	28.7932 - 0.0000i
2	27,386673627	27.3867 - 0.0000i
3	26,639900322	26.6399 - 0.0000i
4	27,45741024	27.4574 - 0.0000i
5	28,765468748	28.7655 - 0.0000i
6	28,637295185	28.6373 - 0.0000i
7	28,762958994	28.7630 - 0.0000i
8	28,667006875	28.6670 - 0.0000i
9	28,665083453	28.6651 - 0.0000i
10	29,50820867	29.5082 - 0.0000i
11	28,858328887	28.8583 - 0.0000i
12	29,578898209	29.5789 - 0.0000i
13	29,481250331	29.4813 - 0.0000i
14	28,368749104	28.3687 - 0.0000i
15	29,198699893	29.1987 - 0.0000i
16	30,126832757	30.1268 - 0.0000i

Numerical series $F_3(1)$, $F_3(2)$,$F_3(3)$,$F_3(4)$,$F_3(5)$,$F_3(6)$,$F_3(7)$,$F_3(8)$, $F_3(9)$,$F_3(10)$,$F_3(11)$, $F_3(12)$, $F_3(13)$, $F_3(14)$, $F_3(15)$,$F_3(16)$ displaying

Exports of goods and services (% of GDP) Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

F_3(t)= (0.00101038855035814+1.85073815265922e-17i)*exp((0.416498486644462+3.14159265358979i)*t)+(28.5183602245768-3.06672581055753e-16i)*exp((0.0327043356651504)*t)+(0.89490650160427+0.891516673494995i)*

exp((-0.0524807500439132+0.831747319722022i)*t)+(0.894906501604271-0.891516673494994i)*exp((-0.0524807500439132-0.831747319722022i)*t)+(1.80822381340168-0.303804905317408i)*exp((-0.154080146453178+1.59845032718303i)*t)+(1.80822381340168+0.303804905317408i)*exp((-0.154080146453178-1.59845032718303i)*t)-(0.650107210522317-4.76389681642411e-15i)*exp((-0.0815555464558303+3.14159265358979i)*t)+(5.98014638456383+1.10088200965189e-14i)*exp((-0.623985808800924+3.14159265358979i)*t)

Really,

Table 22 Exports of goods and services (% of GDP) Poland in 2000-2015

t	Data taken from [11]	Рассчитано автором по фо Calculated by the author according to the formula F_3 (t)
1	27,188326255	27.1883 - 0.0000i
2	27,187325666	27.1873 - 0.0000i
3	28,713122404	28.7131 - 0.0000i
4	33,350449506	33.3504 + 0.0000i
5	34,235460421	34.2355 - 0.0000i
6	34,611571583	34.6116 + 0.0000i
7	37,820953385	37.8210 - 0.0000i
8	38,51628789	38.5163 + 0.0000i
9	37,814869813	37.8149 - 0.0000i
10	37,142253239	37.1423 + 0.0000i
11	39,879212963	39.8792 - 0.0000i
12	42,394223035	42.3942 + 0.0000i
13	44,251473105	44.2515 - 0.0000i
14	46,002608816	46.0026 + 0.0000i
15	47,219683458	47.2197 + 0.0000i
16	49,091228086	49.0912 - 0.0000i

Numerical series $G_3(1)$, $G_3(2)$,$G_3(3)$,$G_3(4)$,$G_3(5)$,$G_3(6)$,$G_3(7)$,$G_3(8)$, $G_3(9)$,$G_3(10)$,$G_3(11)$, $G_3(12)$, $G_3(13)$, $G_3(14)$, $G_3(15)$,$G_3(16)$ displaying

Imports of goods and services (% of GDP) Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$G_3(t)$=-(2.24013850128398e-16+3.93838326623221e-32i)*exp((2.39096025274077+3.14159265358979i)*t)+(0.0906627635895353-0.0484799149350448i)*exp((0.184324412074546+2.81606981064649i)*t)+(0.0906627635895356+0.0484799149350452i)*exp((0.184324412074546-2.81606981064649i)*t)+(0.87111867394538-

0.31551528950254i)*exp((0.0242104048198893+1.57602782365172i)*t)+(0.871118673945394+0.315515289502533i)*exp((0.0242104048198893-1.57602782365172i)*t)+(32.3195569115787-1.01797482877076e-14i)*exp((0.0256101802795993)*t)+(0.789413534636726+0.845599298117906i)*exp((-0.055203059141953+0.726176889876059i)*t)+(0.789413534636722-0.845599298117891i)*exp((-0.055203059141953-0.726176889876059i)*t)

Really,

Table 23 Imports of goods and services (% of GDP) Poland in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $F_3(t)$
1	33,680257267	33.6803 - 0.0000i
2	30,969435019	30.9694 + 0.0000i
3	32,274252845	32.2743 - 0.0000i
4	36,095765577	36.0958 - 0.0000i
5	37,210197076	37.2102 - 0.0000i
6	35,91895248	35.9190 - 0.0000i
7	40,149761883	40.1498 + 0.0000i
8	42,315167561	42.3152 - 0.0000i
9	43,090891129	43.0909 - 0.0000i
10	38,12554436	38.1255 + 0.0000i
11	42,050214121	42.0502 + 0.0000i
12	44,557007151	44.5570 - 0.0000i
13	45,013804004	45.0138 - 0.0000i
14	44,561626599	44.5616 - 0.0000i
15	46,250856102	46.2509 - 0.0000i
16	46,335097429	46.3351 + 0.0000i

Numerical series $H_3(1)$, $H_3(2)$,$H_3(3)$,$H_3(4)$,$H_3(5)$,$H_3(6)$,$H_3(7)$,$H_3(8)$, $H_3(9)$,$H_3(10)$,$H_3(11)$, $H_3(12)$, $H_3(13)$, $H_3(14)$, $H_3(15)$,$H_3(16)$ displaying

Foreign direct investment, net inflows (BoP, current US$) Poland in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$H_3(t)$=-(74362.4582320093+1.04973129213617e-10i)*exp((0.67213315646578+3.14159265358979i)*t)+(689941917.113823+199960768.206753i)*exp((0.139069906644397+1.60158856783659i)*t)+(689941917.113824-199960768.206753i)*exp((0.139069906644397-1.60158856783659i)*t)+(3236601886.4103+1448880482.34377i)*exp((-0.1391808579794+2.4299461698211i)*t)+(3236601886.41029-1448880482.34377i)*exp((-0.1391808579794-

2.4299461698211i)*t)+(27811142835.8101+8.35890910010648e-06i)*exp((-0.0662618542929372)*t)+(5414589313.56377+23152332071.9251i)*exp((-0.275719180778898+0.518347771173131i)*t)+(5414589313.56377-23152332071.9251i)*exp((-0.275719180778898-0.518347771173131i)*t)

Really,

Table 24 Foreign direct investment, net inflows (BoP, current US$) Poland in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $H_3(t)$ 1.0e+10 *
1	9335000000	0.9335 + 0.0000i
2	5677000000	0.5677 + 0.0000i
3	4091000000	0.4091 + 0.0000i
4	5371000000	0.5371 + 0.0000i
5	13868000000	1.3868 + 0.0000i
6	11041000000	1.1041 + 0.0000i
7	21473000000	2.1473 + 0.0000i
8	25031000000	2.5031 + 0.0000i
9	14574000000	1.4574 + 0.0000i
10	14025000000	1.4025 + 0.0000i
11	18395000000	1.8395 + 0.0000i
12	18534000000	1.8534 + 0.0000i
13	7358000000	0.7358 - 0.0000i
14	795000000	0.0795 + 0.0000i
15	19776000000	1.9776 - 0.0000i
16	15065000000	1.5065 + 0.0000i

Numerical series $A_2(1)$, $A_2(2)$,$A_2(3)$,$A_2(4)$,$A_2(5)$,$A_2(6)$,$A_2(7)$,$A_2(8)$, $A_2(9)$,$A_2(10)$,$A_2(11)$, $A_2(12)$, $A_2(13)$, $A_2(14)$, $A_2(15)$,$A_2(16)$ displaying

Electric power consumption (kWh per capital) of Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$A_2(t)$=-(4.39980194109672+5.55062616556177i)*exp((0.213150138194636+2.94062132737833i)*t)-(4.39980194109672-5.55062616556176i)*exp((0.213150138194636-2.94062132737833i)*t)-(14.0783302284838+19.2323053181002i)*exp((0.100977943649856+1.78869563716756i)*t)-(14.0783302284838-19.2323053181002i)*exp((0.100977943649856-1.78869563716756i)*t)-(7.50009809634862+1.33461269580332e-14i)*exp((0.253314801715973)*t)+(4907.78172003383+3.67534553554668e-

12i)*exp((0.0074674906045379)*t)-(50.4839500189002-1.84938077347463i)*exp((-0.0248886308740209+1.18180104223667i)*t)-(50.4839500189005+1.84938077347385i)*exp((-0.0248886308740209-1.18180104223667i)*t)

Really,

Table 25 Electric power consumption (kWh per capital) of Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $B_1(t)$ 1.0e+03 *
1	4955,9078965	4.9559 + 0.0000i
2	5027,4528074	5.0275 + 0.0000i
3	5051,5983896	5.0516 + 0.0000i
4	5021,7982221	5.0218 + 0.0000i
5	5097,8355559	5.0978 + 0.0000i
6	4932,8032814	4.9328 + 0.0000i
7	5153,1214836	5.1531 + 0.0000i
8	5272,3707825	5.2724 + 0.0000i
9	5294,4350988	5.2944 + 0.0000i
10	4954,138251	4.9541 + 0.0000i
11	5201,4048968	5.2014 + 0.0000i
12	5347,5262227	5.3475 + 0.0000i
13	5137,789018	5.1378 + 0.0000i
14	5202,4672881	5.2025 + 0.0000i
15	5137,0738352	5.1371 + 0.0000i
16	5389,451	5.3895 + 0.0000i

Numerical series $B_2(1)$, $B_2(2)$,$B_2(3)$,$B_2(4)$,$B_2(5)$,$B_2(6)$,$B_2(7)$,$B_2(8)$, $B_2(9)$,$B_2(10)$,$B_2(11)$, $B_2(12)$, $B_2(13)$, $B_2(14)$, $B_2(15)$,$B_2(16)$ displaying

GDP (current US$) Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

B_2(t)=-(261792.469785155+1.31523726222117e-09i)*exp((0.776135495273349+3.14159265358979i)*t)-(10823272.2834002+728758.539857282i)*exp((0.505826502116734+2.44423812437637i)*t)-(10823272.2834002-728758.539857232i)*exp((0.505826502116734-2.44423812437637i)*t)+(410965766.317102-776079338.570216i)*exp((0.151960273219643+1.56859627533171i)*t)+(410965766.317104+776079338.570221i)*exp((0.151960273219643-1.56859627533171i)*t)-(959103625.034464+117804318.408749i)*exp((0.251222952561547+0.45063121

7292752i)*t)-(959103625.034466-
117804318.408747i)*exp((0.251222952561547-
0.450631217292752i)*t)+(25915938699.937+1.58859585793354e-
05i)*exp((0.129256455097872)*t)

Really,

Table 26 GDP (current US$) Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $B_2(t)$ 1.0e+11 *
1	29242558797	0.2924 + 0.0000i
2	30778781607	0.3078 + 0.0000i
3	35297794386	0.3530 + 0.0000i
4	46919965224	0.4692 + 0.0000i
5	57437444469	0.5744 + 0.0000i
6	62808723477	0.6281 + 0.0000i
7	70767338922	0.7077 + 0.0000i
8	86563986799	0.8656 + 0.0000i
9	1,0087990298e+011	1.0088 + 0.0000i
10	89399303222	0.8940 + 0.0000i
11	90801178162	0.9080 + 0.0000i
12	99492917849	0.9949 + 0.0000i
13	94253181330	0.9425 - 0.0000i
14	98569320343	0.9857 + 0.0000i
15	1,0108917842e+011	1.0109 - 0.0000i
16	88636928905	0.8864 + 0.0000i

Numerical series $C_2(1)$, $C_2(2)$,$C_2(3)$,$C_2(4)$,$C_2(5)$,$C_2(6)$,$C_2(7)$,$C_2(8)$, $C_2(9)$,$C_2(10)$,$C_2(11)$, $C_2(12)$, $C_2(13)$, $C_2(14)$, $C_2(15)$,$C_2(16)$ displaying

Inflation, GDP deflator (annual %) of Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponents of the function of a complex variable

$C_2(t)$= (1.59237654350204e-05+2.26071251094074e-
20i)*exp((0.761670242335727)*t)+(10.6407998908281+1.40319746773649e-
16i)*exp((-0.195873177156853)*t)-
(0.0689968551150444+0.0960308139152829i)*exp((0.111459534403515+2.2244
4354090978i)*t)-(0.0689968551150435-
0.0960308139152832i)*exp((0.111459534403515-
2.22444354090978i)*t)+(3.10603440051555-1.71539506496143i)*exp((-
0.325094070984767+1.41373069907221i)*t)+(3.10603440051555+1.7153950649
6143i)*exp((-0.325094070984767-1.41373069907221i)*t)+(3.26244102539071-

7.47977787590038i)*exp((-0.41818350539042+2.98174265152676i)*t)+(3.26244102539067+7.47977787590
04i)*exp((-0.41818350539042-2.98174265152676i)*t)

Really,

Table 27 Inflation, GDP deflator (annual %) of Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula C_2 (t)
1	9,4895300113	9.4895 - 0.0000i
2	5,1214869809	5.1215 + 0.0000i
3	3,9378240446	3.9378 + 0.0000i
4	5,3252818298	5.3253 - 0.0000i
5	5,7387291078	5.7387 + 0.0000i
6	2,5431038879	2.5431 - 0.0000i
7	2,8990744194	2.8991 + 0.0000i
8	1,1155435396	1.1155 + 0.0000i
9	2,8580740613	2.8581 - 0.0000i
10	1.69537768065	1.6954 - 0.0000i
11	0,532681317	0.5327 + 0.0000i
12	1,6764771792	1.6765 - 0.0000i
13	1,2601162121	1.2601 + 0.0000i
14	0,50934130118	0.5093 + 0.0000i
15	3,256871235	3.2569 - 0.0000i
16	2,96968532	2.9697 + 0.0000i

Numerical series $D_2(1)$, $D_2(2)$,$D_2(3)$,$D_2(4)$,$D_2(5)$,$D_2(6)$,$D_2(7)$,$D_2(8)$, $D_2(9)$,$D_2(10)$,$D_2(11)$, $D_2(12)$, $D_2(13)$, $D_2(14)$, $D_2(15)$,$D_2(16)$ displaying

Agriculture, forestry, and fishing, value added (% of GDP) Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$D_2(t)$ = -(0.000175094039365627-0.00061651077183537i)*exp((0.377506454927169+2.45858809377303i)*t)-(0.000175094039365624+0.00061651077183354i)*exp((0.377506454927169-2.45858809377303i)*t)-(0.0235322067424225+0.0104822194901567i)*exp((0.101237579989514+1.732626997031 39i)*t)-(0.0235322067424225-0.0104822194901568i)*exp((0.101237579989514-1.73262699703139i)*t)-(0.106397809998707+0.120309093617121i)*exp((0.0267329464018341+0.990591358520523i)*t)-(0.106397809998706-0.120309093617122i)*exp((0.0267329464018341-

0.990591358520523i)*t)+(1.81626069071738-3.43326989739263e-15i)*exp((0.0112833241865959)*t)-(0.547664394386205+4.02208774387264e-15i)*exp((-0.808531071144592)*t)

Really,

Table 28 Agriculture, forestry, and fishing, value added (% of GDP) Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $D_2(t)$
1	1,7103055939	1.7103 - 0.0000i
2	2,1202176786	2.1202 - 0.0000i
3	2,0428990477	2.0429 - 0.0000i
4	1,8103835297	1.8104 - 0.0000i
5	1,6674814979	1.6675 - 0.0000i
6	1,6187862756	1.6188 - 0.0000i
7	1,8482960642	1.8483 - 0.0000i
8	2,2959975272	2.2960 - 0.0000i
9	2,5332008641	2.5332 - 0.0000i
10	2,0851332837	2.0851 - 0.0000i
11	1,5697610288	1.5698 - 0.0000i
12	1,8850696157	1.8851 - 0.0000i
13	1,9051089434	1.9051 - 0.0000i
14	2,2265243345	2.2265 - 0.0000i
15	2,7533228396	2.7533 - 0.0000i
16	2,1979843893	2.1980 - 0.0000i

Numerical series $E_2(1)$, $E_2(2)$,$E_2(3)$,$E_2(4)$,$E_2(5)$,$E_2(6)$,$E_2(7)$,$E_2(8)$, $E_2(9)$,$E_2(10)$,$E_2(11)$, $E_2(12)$, $E_2(13)$, $E_2(14)$, $E_2(15)$,$E_2(16)$ displaying

Industry (including construction), value added (% of GDP) Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$E_2(t)$ = (0.942699254747452-2.02929490601542i)*exp((-0.161096499187524+3.01864585256622i)*t)+(0.942699254747388+2.02929490601546i)*exp((-0.161096499187524-3.01864585256622i)*t)+(0.157960405978434-0.00452255850597907i)*exp((0.109571405450619+1.56503970973324i)*t)+(0.157960405978429+0.00452255850598515i)*exp((0.109571405450619-1.56503970973324i)*t)+(0.634545486256707+0.762548572508337i)*exp((-0.0211977512704947+0.753567936751789i)*t)+(0.634545486256831-0.762548572508977i)*exp((-0.0211977512704947-

0.753567936751789i)*t)+(31.855910334147+9.88148628912016e-12i)*exp((0.0179974480738678)*t)-(1.51384458288785+3.91273601135152e-13i)*exp((0.142123274946474)*t)

Really,

Table 29 Industry (including construction), value added (% of GDP) Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula E_2 (t)
1	29,41685446	29.4169 + 0.0000i
2	29,846455436	29.8465 + 0.0000i
3	29,240332713	29.2403 + 0.0000i
4	30,582156515	30.5822 + 0.0000i
5	32,042649296	32.0426 + 0.0000i
6	31,926984262	31.9270 + 0.0000i
7	34,286242763	34.2862 + 0.0000i
8	33,544719096	33.5447 + 0.0000i
9	33,05655413	33.0566 + 0.0000i
10	29,43670212	29.4367 + 0.0000i
11	30,589856691	30.5899 + 0.0000i
12	30,461922102	30.4619 + 0.0000i
13	30,812921127	30.8129 + 0.0000i
14	28,621915845	28.6219 + 0.0000i
15	30,510103633	30.5101 + 0.0000i
16	30,565409159	30.5654 + 0.0000i

Numerical series $F_2(1)$, $F_2(2)$,$F_2(3)$,$F_2(4)$,$F_2(5)$,$F_2(6)$,$F_2(7)$,$F_2(8)$, $F_2(9)$,$F_2(10)$,$F_2(11)$, $F_2(12)$, $F_2(13)$, $F_2(14)$, $F_2(15)$,$F_2(16)$ displaying

Exports of goods and services (% of GDP) Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$F_2(t)$ = (0.136556756086172-0.0704514085422707i)*exp((0.199930010263397+2.82531103607067i)*t)+(0.136556756756086172+0.0704514085422713i)*exp((0.199930010263397-2.82531103607067i)*t)-(0.0057015257092947 5+0.945227478450443i)*exp((0.0555066041577079+1.72334417788121i)*t)-(0.00570152570928917-0.945227478450452i)*exp((0.0555066041577079-1.72334417788121i)*t)+(1.69182680034848-1.41260173767549i)*exp((0.0583639739857991+0.965323189137538i)*t)+(1.69

182680034849+1.41260173767549i)*exp((0.0583639739857991-0.965323189137538i)*t)+(67.779365247169-9.54235516362912e-14i)*exp((0.0176114000757858)*t)-(33.8198687036203+6.85261799634334e-14i)*exp((-0.43019730137395)*t)

Really,

Table 30 Exports of goods and services (% of GDP) Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula $F_2(t)$
1	53,205468407	53.2055 - 0.0000i
2	57,11818541	57.1182 - 0.0000i
3	56,970495185	56.9705 - 0.0000i
4	62,334348887	62.3343 - 0.0000i
5	69,046324754	69.0463 - 0.0000i
6	72,301893464	72.3019 - 0.0000i
7	81,239853322	81.2399 - 0.0000i
8	83,380861421	83.3809 - 0.0000i
9	80,147995349	80.1480 - 0.0000i
10	68,036118094	68.0361 - 0.0000i
11	76,866361829	76.8664 - 0.0000i
12	84,702520437	84.7025 - 0.0000i
13	91,188484691	91.1885 - 0.0000i
14	93,788865018	93.7889 - 0.0000i
15	91,714576994	91.7146 - 0.0000i
16	91,87320492	91.8732 - 0.0000i

Numerical series $G_2(1)$, $G_2(2)$,$G_2(3)$,$G_2(4)$,$G_2(5)$,$G_2(6)$,$G_2(7)$,$G_2(8)$, $G_2(9)$,$G_2(10)$,$G_2(11)$, $G_2(12)$, $G_2(13)$, $G_2(14)$, $G_2(15)$,$G_2(16)$ displaying

Imports of goods and services (% of GDP) Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$G_2(t)$ =(0.0951599567162818-0.154439209011458i)*exp((0.217274928430996+2.85977449808267i)*t)+(0.0951599567162828+0.154439209011458i)*exp((0.217274928430996-2.85977449808267i)*t)-(0.29899703772873-7.67853460948292e-05i)*exp((0.162951457164902+1.86102447251021i)*t)-(0.298997037728729+7.67853460941909e-05i)*exp((0.162951457164902-1.86102447251021i)*t)+(1.59760675367828-3.11065359500464i)*exp((0.000760267063377983+1.00595231088962i)*t)+(1.59760675367886+3.11065359500333i)*exp((0.000760267063377983-

1.00595231088962i)*t)+(72.4596947028525+5.22486524901687e-14i)*exp((0.0100372340854217)*t)-(42.4559844523781-3.25142334731221e-14i)*exp((-0.543320891923454)*t)

Really,

Table 31 Imports of goods and services (% of GDP) Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula G_2 (t)
1	55,582946715	55.5829 - 0.0000i
2	64,561106118	64.5611 + 0.0000i
3	63,40339142	63.4034 + 0.0000i
4	62,813330094	62.8133 + 0.0000i
5	70,604052543	70.6041 + 0.0000i
6	75,426002122	75.4260 - 0.0000i
7	83,386433185	83.3864 - 0.0000i
8	82,948691513	82.9487 - 0.0000i
9	81,922861251	81.9229 + 0.0000i
10	68,204572928	68.2046 + 0.0000i
11	77,174671636	77.1747 + 0.0000i
12	83,999860375	83.9999 - 0.0000i
13	85,659965962	85.6600 - 0.0000i
14	88,175092194	88.1751 - 0.0000i
15	86,886255477	86.8863 + 0.0000i
16	88,803277663	88.8033 + 0.0000i

Numerical series $H_2(1)$, $H_2(2)$,$H_2(3)$,$H_2(4)$,$H_2(5)$,$H_2(6)$,$H_2(7)$,$H_2(8)$, $H_2(9)$,$H_2(10)$,$H_2(11)$, $H_2(12)$, $H_2(13)$, $H_2(14)$, $H_2(15)$,$H_2(16)$ displaying

Foreign direct investment, net inflows (BoP, current US$) Slovakia in 2000-2015 can be interpolated on the time interval [1,16] by a function consisting of the sum of eight exponentials of the function of a complex variable

$H_2(t)$ =(-42069362.2812586+68852108.6949037i)*exp((0.191246889389006+1.92415685200028i)*t)-(42069362.2812585+68852108.6949036i)*exp((0.191246889389006-1.92415685200028i)*t)+(107707842.078656+6.66768630612506e-07i)*exp((0.186345134004658+3.14159265358979i)*t)-(1977169309.20755-7.2283314140941e-06i)*exp((-0.0987245052627747+3.14159265358979i)*t)-(408151640.554898+606980291.291193i)*exp((-0.0149425864558289+1.15338180598296i)*t)-(408151640.554891-606980291.291194i)*exp((-0.0149425864558289-1.15338180598296i)*t)-(950019096.482962+4443630497.25114i)*exp((-

0.0882106994320273+0.195660796218186i)*t)-(950019096.482958-4443630497.25114i)*exp((-0.0882106994320273-0.195660796218186i)*t)

Really,

Table 32 Foreign direct investment, net inflows (BoP, current US$) Slovakia in 2000-2015

t	Data taken from [11]	Calculated by the author according to the formula H_2 (t) `1.0e+09 *`
1	2183119136	2.1831 - 0.0000i
2	1532584052,1	1.5326 + 0.0000i
3	4212437461	4.2124 - 0.0000i
4	969200518,93	0.9692 + 0.0000i
5	4063498784,6	4.0635 - 0.0000i
6	3923508331,5	3.9235 + 0.0000i
7	5701436726,9	5.7014 - 0.0000i
8	5058234422,2	5.0582 + 0.0000i
9	4640891412	4.6409 - 0.0000i
10	1521083444,3	1.5211 + 0.0000i
11	2115832960,2	2.1158 - 0.0000i
12	5431592591,9	5.4316 - 0.0000i
13	1776566141,1	1.7766 + 0.0000i
14	1003901609,2	1.0039 - 0.0000i
15	1262144767.55	1.2621 + 0.0000i
16	1520387925,9	1.5204 - 0.0000i

Table 33 .The value of the coefficients , , , ,
, , , , , , , , , , , , , , (calculated by the author)

i=1 ,j=2	314,4645	331,3384	419,037	449,1864	592,9547	694,1355	744,8168	924,7734	1046,9	887,5804	932,7324	1006,071	945,4238	956,2354	973,9234	831,6195
i=1 ,j=3	1686,049	1815,042	1919,532	2067,953	2549,953	3035,121	3450,321	4310,313	5098,289	4233,097	4656,476	5043,828	4675,614	4771,508	5164,723	4481,941
i=1 ,j=4	1308,711	1506,15	1872,641	2126,025	2665,337	3754,818	3457,568	5736,329	6265,198	4613,945	5347,138	3922,806	3729,009	3655,977	3987,896	3460,728
i=2 ,j=1	570,7481	604,5888	759,8839	824,1565	1077,111	1262,97	1356,236	1686,13	1923,066	1637,252	1715,563	1846,041	1736,463	1756,379	1784,038	1527,142
i=2 ,j=3	1820,763	1859,788	2034,503	2339,323	3029,627	3356,667	4006,449	4867,254	5506,629	4663,152	5017,34	5552,4	4947,122	5002,175	5588,165	4872,419
i=2 ,j=4	898,7475	1019,353	1279,401	1548,214	1923,251	2504,684	2428,13	3809,928	4208,873	3107,869	3508,317	2764,014	2492,328	2499,206	2735,462	2458,629
i=3 ,j=1	1593,155	1705,652	1793,353	1933,768	2397,557	2841,059	3253,31	4059,415	4771,916	3962,373	4370,206	4734,556	4367,355	4446,045	4858,781	4213,256
i=3 ,j=2	1153,996	1152,637	1294,643	1474,956	1968,978	2144,206	2595,265	3123,988	3459,532	2928,428	3144,222	3507,252	3063,468	3068,487	3482,193	3032,88
i=3 ,j=4	1573,027	1706,247	1923,412	2311,369	2905,53	3699,89	3851,991	5791,489	6347,77	4840,561	5526,754	4650,023	4136,655	4081,243	4756,916	4199,724
i=4 ,j=1	1608,803	1843,72	2299,711	2600,68	3266,189	4484,183	4178,248	6686,183	7328,534	5484,723	6273,806	4834,01	4594,891	4531,094	4887,719	4228,47
i=4 ,j=2	1460,44	1657,924	2088,901	2500,908	3119,738	4170,344	4006,119	6486,137	7141,67	5189,929	5939,007	4487,711	4031,547	4008,739	4428,886	3991,167
i=4 ,j=3	2642,276	2851,553	3182,265	3786,284	4752,473	5845,428	6236,694	8891,528	9839,169	7673,529	8632,452	7799,152	6953,339	6930,104	7970,905	7016,387
i=1 ,j=2	570,7481	604,5888	759,8839	824,1565	1077,111	1262,97	1356,236	1686,13	1923,066	1637,252	1715,563	1846,041	1736,463	1756,379	1784,038	1527,142
i=1 ,j=3	1593,155	1705,652	1793,353	1933,768	2397,557	2841,059	3253,31	4059,415	4771,916	3962,373	4370,206	4734,556	4367,355	4446,045	4858,781	4213,256
i=1 ,j=4	1608,803	1843,72	2299,711	2600,68	3266,189	4484,183	4178,248	6686,183	7328,534	5484,723	6273,806	4834,01	4594,891	4531,094	4887,719	4228,47
i=2 ,j=1	314,4645	331,3384	419,037	449,1864	592,9547	694,1355	744,8168	924,7734	1046,9	887,5804	932,7324	1006,071	945,4238	956,2354	973,9234	831,6195
i=2 ,j=3	1153,996	1152,637	1294,643	1474,956	1968,978	2144,206	2595,265	3123,988	3459,532	2928,428	3144,222	3507,252	3063,468	3068,487	3482,193	3032,88
i=2 ,j=4	1460,44	1657,924	2088,901	2500,908	3119,738	4170,344	4006,119	6486,137	7141,67	5189,929	5939,007	4487,711	4031,547	4008,739	4428,886	3991,167
i=3 ,j=1	1686,049	1815,042	1919,532	2067,953	2549,953	3035,121	3450,321	4310,313	5098,289	4233,097	4656,476	5043,828	4675,614	4771,508	5164,723	4481,941
i=3 ,j=2	1820,763	1859,788	2034,503	2339,323	3029,627	3356,667	4006,449	4867,254	5506,629	4663,152	5017,34	5552,4	4947,122	5002,175	5588,165	4872,419
i=3 ,j=4	2642,276	2851,553	3182,265	3786,284	4752,473	5845,428	6236,694	8891,528	9839,169	7673,529	8632,452	7799,152	6953,339	6930,104	7970,905	7016,387
i=4 ,j=1	1308,711	1506,15	1872,641	2126,025	2665,337	3754,818	3457,568	5736,329	6265,198	4613,945	5347,138	3922,806	3729,009	3655,977	3987,896	3460,728
i=4 ,j=2	898,7475	1019,353	1279,401	1548,214	1923,251	2504,684	2428,13	3809,928	4208,873	3107,869	3508,317	2764,014	2492,328	2499,206	2735,462	2458,629
i=4 ,j=3	1573,027	1706,247	1923,412	2311,369	2905,53	3699,89	3851,991	5791,489	6347,77	4840,561	5526,754	4650,023	4136,655	4081,243	4756,916	4199,724

Finally , the model can be written as:

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Discussion

The use of interpolation of time series by sums of exponents allows you to achieve a good result when constructing an interpolation function . Although time series are interpolated by functions of a complex variable, if the model (17) does not take into account the imaginary part of the numbers arising during the calculation $\mathbf{w_i}$, модель может иметь практическое применение

Interpolation of time series by the sum of exponents of a function of a complex variable gives an approximation no worse than using regression analysis. . To calculate the interpolating function, the author used standard procedures used in the MATHLAB software.

The absence of extremum points for exponents is the main advantage when using exponent sums for interpolation purposes compared to interpolation by polynomials.

Conclusions

The use of complex variable functions for the interpolation of numerical series makes it possible to expand the capabilities of researchers to build more accurate economic and mathematical models describing socio-economic processes.

The use of the sum of exponents of the complex variable function as an interpolation function makes it possible to achieve the accuracy required for practical application, while using standard software packages.

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Appendix

Table A1. Some macroeconomic indicators of the Czech Republic , Slovakia , Poland and Hungary in 2000-2015 [11]

Country Code	Series Name	Series Code	2000	2001	2002	2003
CZE	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	5703,8167391	5892,1725955	5894,2331191	6074,8491416
CZE	GDP (current US$)	NY.GDP.MKTP.CD	61828166496	67808032980	82196001051	1,0009046758e+011
CZE	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	1,8421337278	4,8892849577	2,7243493953	1,2927226315
CZE	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	3,2505283308	3,2035270863	2,6595867234	2,4400273141
CZE	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	33,491207477	33,909200248	33,209289397	32,342253383
CZE	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	48,090989817	48,856511857	45,004128604	46,728047794
CZE	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	49,95534908	50,155944301	46,33052172	48,245481064
CZE	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	4987079129,3	5640707235,9	8496609035,8	2021275746
HUN	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	3309,2837106	3426,7229025	3545,1707557	3637,2783318
HUN	GDP (current US$)	NY.GDP.MKTP.CD	47218405892	53749989092	67608919144	85302003908
HUN	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	9,5834818848	11,046560272	8,0915105951	5,4439806828
HUN	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	4,9344598775	4,914388877	4,2607950426	3,9010994726
HUN	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	27,048550996	27,137829817	26,807025341	26,383802997
HUN	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	66,857889777	64,877320813	58,136973575	56,333158094
HUN	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	70,548711458	66,167747927	60,183135587	60,273016181
HUN	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	2747712559,8	4058819560,7	3643428379,5	4157510420,3
POL	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	3256,1804554	3260,0332628	3208,3921566	3324,4713918
POL	GDP (current US$)	NY.GDP.MKTP.CD	1,7221946113e+011	1,9090549354e+011	1,9907205882e+011	2,1782726081e+011
POL	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	6,1233217512	3,1198610944	1,850183388	0,77603080012
POL	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	3,1267243211	3,2534150174	2,7257594673	2,6098031994
POL	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	28,793172323	27,386673627	26,639900322	27,45741024
POL	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	27,188326255	27,187325666	28,713122404	33,350449506
POL	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	33,680257267	30,969435019	32,274252845	36,095765577
POL	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	9335000000	5677000000	4091000000	5371000000
SVK	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	4955,9078965	5027,4528074	5051,5983896	5021,7982221
SVK	GDP (current US$)	NY.GDP.MKTP.CD	29242558797	30778781607	35297794386	46919965224
SVK	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	9,4895300113	5,1214869809	3,9378240446	5,3252818298
SVK	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	1,7103055939	2,1202176786	2,0428990477	1,8103835297
SVK	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	29,41685446	29,846455436	29,240332713	30,582156515
SVK	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	53,205468407	57,11818541	56,970495185	62,334348887
SVK	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	55,582946715	64,561106118	63,40339142	62,813330094
SVK	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	2183119136,1	1532584052,1	4212437461	969200518,93

Table A1. (continued) Some macroeconomic indicators of the Czech Republic , Slovakia , Poland and Hungary in 2000-2015 [11]

Country Code	Series Name	Series Code	2004	2005	2006	2007
CZE	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	6230,3982279	6357,4210946	6528,5301504	6518,2174127
CZE	GDP (current US$)	NY.GDP.MKTP.CD	1,1981443435e+011	1,3714347133e+011	1,5626409566e+011	1,9018380088e+011
CZE	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	4,049045319	0,094944269676	0,65410532087	3,540381807
CZE	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	2,415394613	2,284635292	2,1649554318	2,0889055748
CZE	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	33,579749591	33,617198193	34,333215988	34,182736616
CZE	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	57,057839892	61,813226865	64,875423442	66,100769186
CZE	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	56,43112009	59,484733539	62,152958426	63,67824812
CZE	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	6423465150,8	13730164683	7132002407,7	13815656004
HUN	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	3680,1684669	3771,364614	3882,4906641	3976,5189771
HUN	GDP (current US$)	NY.GDP.MKTP.CD	1,0414104263e+011	1,1323671164e+011	1,157512667e+011	1,4022756062e+011
HUN	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	5,0947822066	2,6292775446	3,6635226666	5,4423277395
HUN	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	4,3515633277	3,7205466568	3,5345223029	3,4855416814
HUN	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	26,845397915	27,175641876	27,183479395	26,694193006
HUN	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	59,550692973	62,501087386	73,757866052	77,796898397
HUN	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	63,871641774	65,283158908	75,204880041	77,656060153
HUN	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	4538099567,2	27489690204	18678720025	70631297039
POL	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	3416,1186324	3437,3239982	3584,9621881	3661,6461038
POL	GDP (current US$)	NY.GDP.MKTP.CD	2,5511018154e+011	3,0614433627e+011	3,4462200309e+011	4,2902850537e+011
POL	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	4,9166469619	2,5591805303	1,7284234987	3,7170784662
POL	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	3,2926049013	2,9189423844	2,6919922837	3,0455373774
POL	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	28,765468748	28,637295185	28,762958994	28,667006875
POL	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	34,235460421	34,611571583	37,820953385	38,51628789
POL	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	37,210197076	35,91895248	40,149761883	42,315167561
POL	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	13868000000	11041000000	21473000000	25031000000
SVK	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	5097,8355559	4932,8032814	5153,1214836	5272,3707825
SVK	GDP (current US$)	NY.GDP.MKTP.CD	57437444469	62808723477	70767338922	86563986799
SVK	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	5,7387291078	2,5431038879	2,8990744194	1,1155435396
SVK	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	1,6674814979	1,6187862756	1,8482960642	2,2959975272
SVK	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	32,042649296	31,926984262	34,286242763	33,544719096
SVK	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	69,046324754	72,301893464	81,239853322	83,380861421
SVK	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	70,604052543	75,426002122	83,386433185	82,948691513
SVK	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	4063498784,6	3923508331,5	5701436726,9	5058234422,2

Table A1. (continued) Some macroeconomic indicators of the Czech Republic , Slovakia , Poland and Hungary in 2000-2015 [11]

Country Code	Series Name	Series Code	2008	2009	2010	2011
CZE	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	6489,1262574	6139,3520604	6348,4243981	6298,7276784
CZE	GDP (current US$)	NY.GDP.MKTP.CD	2,3681648576e+011	2,0743429681e+011	2,0906994096e+011	2,295627334e+011
CZE	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	2,0095812372	2,5878206809	1.28362436145	-0,020571958
CZE	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	1,9199279718	1,7567875134	1,5405961126	1,9825109919
CZE	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	33,657633458	32,987694471	33,170751865	33,650573822
CZE	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	62,951648091	58,345429808	65,543005407	70,821867193
CZE	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	60,790851031	54,451814724	62,485906128	67,040951692
CZE	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	8815393022,1	5271613701,8	10167834375	4188736491,3
HUN	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	3988,7676939	3773,1538066	3876,4910841	3898,8231427
HUN	GDP (current US$)	NY.GDP.MKTP.CD	1,5837441964e+011	1,3111422905e+011	1,3223113416e+011	1,4199996021e+011
HUN	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	4,8052931064	4,2000270758	2,533695914	1,9338207051
HUN	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	3,4519044884	3,0553968665	3,032888355	3,9936143865
HUN	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	25,753130858	25,080742933	25,189272761	25,093904329
HUN	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	79,156518092	74,198793843	81,073087589	86,042722818
HUN	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	79,119989828	70,751367251	76,325396658	80,322837265
HUN	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	75107772943	42924369747	62824164246	10740966551
POL	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	3725,7487779	3590,8320812	3797,0922956	3879,5420938
POL	GDP (current US$)	NY.GDP.MKTP.CD	5,3360908185e+011	4,3973750841e+011	4,7983417902e+011	5,2830126907e+011
POL	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	3,8943510974	3,7855576881	1,6509067194	3,2705748198
POL	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	2,5926222667	2,5589183871	2,8577372543	3,0850643124
POL	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	28,665083453	29,50820867	28,858328887	29,578898209
POL	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	37,814869813	37,142253239	39,879212963	42,394223035
POL	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	43,090891129	38,12554436	42,050214121	44,557007151
POL	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	14574000000	14025000000	18395000000	18534000000
SVK	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	5294,4350988	4954,138251	5201,4048968	5347,5262227
SVK	GDP (current US$)	NY.GDP.MKTP.CD	1,0087990298e+011	89399303222	90801178162	99492917849
SVK	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	2,8580740613	1.69537768065	0,532681317	1,6764771792
SVK	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	2,5332008641	2,0851332837	1,5697610288	1,8850696157
SVK	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	33,05655413	29,43670212	30,589856691	30,461922102
SVK	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	80,147995349	68,036118094	76,866361829	84,702520437
SVK	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	81,922861251	68,204572928	77,174671636	83,999860375
SVK	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	4640891412	1521083444,3	2115832960,2	5431592591,9

Table A1. (continued) Some macroeconomic indicators of the Czech Republic , Slovakia , Poland and Hungary in 2000-2015 [11]

Country Code	Series Name	Series Code	2012	2013	2014	2015
CZE	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	2,0885771932e+011	2,1168561659e+011	2,0935883416e+011	1,8803305046e+011
CZE	GDP (current US$)	NY.GDP.MKTP.CD	1,4509210706	1,3647047378	2,5785363157	0,99227616029
CZE	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	2,2511856455	2,3647711662	2,4134525421	2,2112138727
CZE	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	32,922327504	32,646070506	33,839350761	33,781822805
CZE	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	75,646186565	76,058381616	81,954274574	80,558778115
CZE	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	70,882670011	70,364035434	75,620707604	74,616885366
CZE	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	9433199804,8	7357578652,6	8088661929,9	1699914616,6
CZE	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	3923,0423245	3892,1137013	3965,9582335	3966,865
HUN	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	1,2885737048e+011	1,3573259572e+011	1,4107898482e+011	1,2521032461e+011
HUN	GDP (current US$)	NY.GDP.MKTP.CD	2,8932006013	2,8188415169	3,6974611273	2,776554175
HUN	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	3,8897887499	3,9156922228	3,9347824318	3,7884693126
HUN	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	25,009833198	25,040168525	25,682318567	26,375612421
HUN	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	85,850682046	85,380441919	87,095589554	87,501175472
HUN	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	79,742591367	78,9072106	81,245125164	79,770951585
HUN	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	10815928328	5414494216	13060104659	13090504751
HUN	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	3899,1766423	3938,2552077	3971,7997613	3897,457
POL	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	4,9852356825e+011	5,2101626273e+011	5,4247709621e+011	4,7781191139e+011
POL	GDP (current US$)	NY.GDP.MKTP.CD	2,3614948439	0,30491741102	0,52186872818	0,97402825079
POL	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	2,9143634328	3,0911676759	2,848161922	2,3746441088
POL	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	29,481250331	28,368749104	29,198699893	30,126832757
POL	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	44,251473105	46,002608816	47,219683458	49,091228086
POL	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	45,013804004	44,561626599	46,250856102	46,335097429
POL	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	7358000000	795000000	19776000000	15065000000
POL	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	5137,789018	5202,4672881	5137,0738352	5389,451
SVK	Electric power consumption (kWh per capita)	EG.USE.ELEC.KH.PC	94253181330	98569320343	1,0108917842e+011	88636928905
SVK	GDP (current US$)	NY.GDP.MKTP.CD	1,2601162121	0,50934130118	3,256871235	2,96968532
SVK	Inflation, GDP deflator (annual %)	NY.GDP.DEFL.KD.ZG	1,9051089434	2,2265243345	2,7533228396	2,1979843893
SVK	Agriculture, forestry, and fishing, value added (% of GDP)	NV.AGR.TOTL.ZS	30,812921127	28,621915845	30,510103633	30,565409159
SVK	Industry (including construction), value added (% of GDP)	NV.IND.TOTL.ZS	91,188484691	93,788865018	91,714576994	91,87320492
SVK	Exports of goods and services (% of GDP)	NE.EXP.GNFS.ZS	85,659965962	88,175092194	86,886255477	88,803277663
SVK	Imports of goods and services (% of GDP)	NE.IMP.GNFS.ZS	1776566141,1	1003901609,2	1262144767.55	1520387925,9
SVK	Foreign direct investment, net inflows (BoP, current US$)	BX.KLT.DINV.CD.WD	6304,571923	6284,7908062	6258,891037	6296,485

Table 2A. The volume of foreign trade activity between the Visegrad Four countries in 2000-2015 [11]

Year	Export from the Czech Republic to Hungary, thousand US dollars	Import to the Czech Republic from Hungary, thousand US dollars	Export from the Czech Republic to Poland, thousand US dollars	Import to the Czech Republic from Poland, thousand US dollars	Export from the Czech Republic to Slovakia, thousand US dollars	Import to the Czech Republic from Slovakia, thousand US dollars	Exports from Poland to Hungary, thousand US dollars	Import to Poland from Hungary, thousand US dollars	Exports from Poland to Slovakia, thousand US dollars	Import to Poland from Slovakia, thousand US dollars	Exports from Slovakia to Hungary, thousand US dollars	Import to Slovakia from Hungary, thousand US dollars
2000	544432,25	515541,59	1578192,86	1148803,78	2230168,79	1932692,24	631038	753292	416561	706313	578695,4	268374,34
2001	630815,78	632347,2	1729869,8	1368242,46	2681287,78	1961543,18	733643	778506	491745	740927	679574,49	377011,69
2002	1074292,21	857041,51	2053246,17	1880904,66	3404070,45	2988055,33	903530	909581	547724	794638	789129,54	454073,54
2003	1110620,69	1042666	2336382,59	2129850,12	3884015,21	2656816,58	1270885	1199728	846740	1028483	1067965,46	775919,34
2004	1886741,84	1397440,23	3443822,45	3218976,51	5407615,51	3573031,92	1893845,3	1663510,84	1317768,57	1453390,6	1431352,63	998002,79
2005	2085683,71	1675700,22	4266184,48	3789015,08	6733382,45	4155098,15	2538221,54	1838006,81	1709089,15	1872217,94	1891777,75	1228832,7
2006	2855510	2267417,76	5390575	5270903	8023954	5009875,11	3330689,3	2699872,51	2292906,02	2219059,06	2486490,58	1952593,35
2007	3807697,38	3358696,19	7146769,12	6684487,11	10508420,31	6220489,2	4033807,69	3449829,9	3026313,41	2986895,53	3648001,25	3040803,34
2008	4150478,26	3866684,66	9468072,68	8290826,14	13437522,1	7894163,06	4791354,2	3747065,4	4201267,41	3996143,05	4327429,78	3599398,54
2009	2886197,62	2356825,4	6577658,04	6736388,38	10185712,03	5708548,19	3698996,11	2804716,65	3131916,65	3054175,86	3828648,49	2609520,96
2010	3050705,05	2733596,47	8129414,1	8041080,16	11595995,93	6505285,71	4436609,04	3056781,91	4073253,74	3599348,32	4636805,83	2758648,79
2011	3658346,93	3341921,54	10267814,29	10001664,37	14565372,54	8648623,64	4839700,54	3693669,62	4549098,12	4314891,38	6189777,7	3164565,52
2012	3600918,59	3308285,01	9520874,06	9966392,81	14177411,26	8514252,74	4270586,78	3156863,04	4527986,69	3963624,75	6185610,61	2814832,84
2013	4216270,23	3450979,88	9667846,12	10756290,07	14304064,33	8176816,32	5191658,76	3392843,99	5306159,43	4061910,76	5832187,45	3592280,84
2014	4871279,13	3576458,42	10415027,33	11865462,9	14640788,75	8121678,79	5652912,85	3378110,33	5351192,9	3967297,56	5655846,79	3917228,77
2015	4680773,07	3334565,66	9228940,9	11159827,35	14145818,72	7227569,77	5163191,35	3120386,39	4893243,19	3389971,24	4581086,3	3623916,02