Correction to: "On the Chambers–Mallows–Stuck Method for Simulating Skewed Stable Random Variables"

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In the paper Weron (1996), I gave a proof to the equality in law of a skewed stable variable and a nonlinear transformation of two independent uniform and exponential variables. The Chambers et al. (1976) method of computer generation of a skewed stable random variable is based on this equality.

The lack of an explicit proof of this formula has led to some inaccuracies in the literature. Unfortunately an error crept into my calculations as well.

Equation (3.3) of Theorem 3.1 (in Weron (1996)) gives a formula for a stable random variable $X \sim S_1(\sigma_2 = 1, \beta, 0)$ (in representation (2.5)). To obtain formula (3.9), which is supposed to be $S_1(\sigma = 1, \beta, 0)$ (in representation (2.1)), I then have merely multiplied the expression in (3.3) by $\frac{2}{\pi}$, forgetting that for $\alpha = 1$, this gives a random variable with $\sigma = 1$ and $\mu = -\frac{2}{\pi}\beta \log \frac{2}{\pi}$ (see the last formula in Weron (1996)). Adding $\frac{2}{\pi}\beta \log \frac{2}{\pi}$ back in to obtain a random variable with $\sigma = 1$ and $\mu = 0$ effectively places a $\frac{\pi}{2}$ in front of the W inside the *log*, which is exactly equation (2.4) of Chambers et al. (1976).

In view of the above, formula (3.9) should read as follows:

$$X = \frac{2}{\pi}\left[\left(\frac{\pi}{2} + \beta V\right)\tan V - \beta \log\left(\frac{\frac{\pi}{2}W\cos V}{\frac{\pi}{2} + \beta V}\right)\right].$$

Acknowledgements

References

Chambers, J.M., Mallows, C.L. and Stuck, B.W. (1976), A method for simulating stable random variables, *J. Amer. Statist. Assoc.* **71**, 340–344.

Weron, R. (1996), On the Chambers-Mallows-Stuck method for simulating skewed stable random variables, *Statist. Probab. Lett.* **28**, 165-171