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CORRECTION

BIARD, R. AND SAUSSEREAU, B. (2014). Fractional Poisson process: long-range dependence and applications in ruin theory. *J. Appl. Prob.* **51,** 727–740.

There is a mistake in the proof of Theorem 1 of our paper 'Fractional Poisson process: long-range dependence and applications in ruin theory'. However, our result holds and we propose another proof here.

We follow the framework and notation of the above paper. In Section 1 we fix the gap in the proof of the main result of the above paper and, consequently, the fractional Poisson process has the long-range dependence property as stated in Theorem 1 of the above paper.

1. True proof of Theorem 1 of the above paper

The proof of Theorem 1 of the above paper is correct until the bottom of page 732 where we have used the following false inequality:

$$\int_{1-1/t}^{1} (1-u)^h u^{h-1}\,\mathrm{d}u \geq \mathcal{B}(1+h,h), \tag{1}$$

where $\mathcal{B}$ denotes the beta function.

In order to fix this gap, we have to replace (10) of page 733. The following proof indicates how we can easily correct our original error.

Proof. We start again our proof after (9) of page 732. By (7) and (8) from the above paper, we also may write

$$\begin{aligned}\operatorname{var}(N_h(tm)-N_h(tm-m)) &= 2h\bigg(\frac{\lambda}{\Gamma(1+h)}\bigg)^2\int_{tm-m}^{tm}(tm-r)^h r^{h-1}\,\mathrm{d}r\\ &\quad+\frac{\lambda}{\Gamma(1+h)}((tm)^h-(tm-m)^h)\\ &\quad-\bigg\{\frac{\lambda}{\Gamma(1+h)}((tm)^h-(tm-m)^h)\bigg\}^2.\end{aligned}$$

Since

$$\int_{tm-m}^{tm}(tm-r)^h r^{h-1}\,\mathrm{d}r=(tm)^{2h}\int_{1-1/t}^{1}(1-u)^h u^{h-1}\,\mathrm{d}u,$$

we obtain

$$\begin{aligned}&\operatorname{var}(N_h(tm)-N_h(tm-m))\\ &\quad=\bigg(\frac{\lambda}{\Gamma(1+h)}\bigg)^2\bigg[2h\int_{1-1/t}^{1}(1-u)^h u^{h-1}\,\mathrm{d}u-\bigg\{1-\bigg(1-\frac{1}{t}\bigg)^h\bigg\}^2\bigg](tm)^{2h}\\ &\qquad+\frac{\lambda}{\Gamma(1+h)}\bigg(1-\bigg(1-\frac{1}{t}\bigg)^h\bigg)(tm)^h.\end{aligned}$$