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Erratum

Erratum to: “Ruin probability in the presence of risk investments” [Stochastic Process Appl. 116 (2006) 267–278]

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1. Inequality (5.6) should be replaced by

$$\mathbf{E}(\eta_1^* M_1)^q \le 2(c^*)^q K_1^* K_2^*,$$

where K_1 and K_2 are derived below.

Indeed, setting $w_u^* = \sup_{0\le s\le u}(-w_s - \frac{\kappa}{\sigma}s)$ we get

$$\mathbf{E}(\eta_1^* M_1)^q = (c^*)^q \mathbf{E}\left(\int_0^{\theta_1} \mathrm{e}^{-\sigma w_u - \kappa u}\mathrm{d}u\right)^q$$
$$\le (c^*)^q \mathbf{E}\theta_1^q \mathrm{e}^{q\sigma w_{\theta_1}^*} = (c^*)^q \alpha \int_0^\infty t^q \mathbf{E}\mathrm{e}^{q\sigma w_t^*}\mathrm{e}^{-\alpha t}\mathrm{d}t.$$

The last integral we estimate as

$$\int_0^\infty t^q \mathbf{E}\mathrm{e}^{q\sigma w_t^*}\mathrm{e}^{-\alpha t}\mathrm{d}t \le \frac{2}{\alpha} K_1^* \mathbf{E}\mathrm{e}^{q\sigma w_\tau^*},$$

where $K_1^* = \sup_{t\ge 0}(t^q \mathrm{e}^{-\frac{\alpha}{2}t})$ and τ is an exponential random variable with the parameter $\alpha/2$ independent of $(w_u)_{u\ge 0}$. Moreover, taking into account that the random variable w_τ^* is exponential (see, for example, [1] p. 197) we find that

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$$K_2^* = \mathbf{E}e^{q\sigma w_\tau^*} = \frac{\sqrt{\alpha\sigma^2 + \kappa^2} + \kappa}{\sqrt{\alpha\sigma^2 + \kappa^2} - \kappa - \varepsilon\sigma^2} < \infty$$

for any $0 < \varepsilon < \sqrt{\alpha_1 + \kappa_1^2} - \kappa_1$ with $\alpha_1 = \alpha/\sigma^2$ and $\kappa_1 = \kappa/\sigma^2$.

Note that in the original article we make use of the upper bound for $\eta_1^* M_1$ on p. 274 which is not true.

2. One needs to change the sign in the representation for x_∞ on p. 278 as $x_\infty = \prod_{j=2}^{t_1} \lambda_j(\varsigma - \xi_1)$ and, max to min in the definition of the function f_1 on p. 278, i.e. $f_1(x) = \min(x^2, 1)\mathbf{1}_{\{x \le 0\}}$.

References

[1] A. Borodin, P. Salminen, Handbook of Brownian Motion and Formulae, Birkhauser, 1996.