Bulinskaya E.V. (Lomonosov MSU, Russia)

Risk networks

Risk networks became popular during the last decade of the 21st century (see [1], [2]).
Theorem. *Gerber-Shiu function* $\phi(u_0, ..., u_n)$ *for* $(n+1)$*-dimensional network satisfies the following integro-differential equation*

$$(\delta + \sum_{i=0}^{n} \lambda_i)\phi(u_0, ..., u_n) = \sum_{i=0}^{n} c_i \frac{\partial}{\partial u_i}\phi(u_0, ..., u_n) +$$

$$+\lambda_0 \int_0^{u_0} \phi(u_0 - x, u_1, ..., u_n) f_0(x)dx + \lambda_0 \int_{u_0}^{\infty} w(\sum_{i=0}^{n} u_i, x - u_0) f_0(x)dx +$$

$$+\sum_{i=1}^{n} \left(\lambda_i \int_0^{\min(\frac{u_0}{\beta_i}, \frac{u_i}{\alpha_i})} \phi(u_0 - \beta_i x, u_1, ..., u_{i-1}, u_i - \alpha_i x, u_{i+1}, ..., u_n) f_i(x)dx + \right.$$

$$\left. + \lambda_i \int_{\min(\frac{u_0}{\beta_i}, \frac{u_i}{\alpha_i})}^{\infty} w(\sum_{j=0}^{n} u_j, (\beta_i x - u_0)^+, (\alpha_i x - u_i)^+) f_i(x)dx \right),$$

where u_i *is the initial capital of company* i *and* $f_i(x)$ *is the density of its claims,* $i = 0, 1, ..., n$.

[1] E.V. Bulinskaya (2017). New research directions in modern actuarial sciences. // *Modern problems of stochastic analysis and statistics – selected contributions in honor of Valentin Konakov (ed. V.Panov)*, Springer, P. 349–408.

[2] A. Florin and Sooie-Hoe Loke (2018). On Central Branch/Reinsurance Risk Networks: Exact Results and Heuristics. // Risks. — V. 6, no 2, 35, 18 p.