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The Finite-Time Gerber-Shiu Function as a Risk Measure

We consider a finite-time version of the Gerber-Shiu (G-S) function defined as follows:

$$m_\delta(u;t) = E\big[e^{-\delta(t\wedge T)} w(U_{(t\wedge T)-}, U_{t\wedge T}) \,|\, U_0 = u\big], \quad u \geq 0,\, t > 0,$$

for general surplus processes U_t and bi-variate penalty functions w (where T is the time to ruin).

For special choices of the penalty function w that discriminate between ruin and non-ruin events, we show that $m_\delta(u;t) = \rho_t(U_t)$ is a risk measure that can be used for hedging positions on the surplus processes U_t.

Numerical illustrations are given for different insurance surplus.