

**Stanford, D. A.; Avram, F.; Badescu, A. L.; Breuer, L.; da Silva Soares, A.; Latouche, G.**  
**Phase-type approximations to finite-time ruin probabilities in the Sparre Andersen and stationary renewal risk models.** (English) [Zbl 1123.62078](#)  
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Summary: The present paper extends the “Erlangization” idea introduced by *S. Asmussen, F. Avram* and *M. Usabel* [ibid. 32, No. 2, 267–281 (2002; [Zbl 1081.60028](#))] to the Sparre Andersen and stationary renewal risk models. Erlangization yields an asymptotically exact method for calculating finite time ruin probabilities with phase-type claim amounts. The method is based on finding the probability of ruin prior to a phase-type random horizon, independent of the risk process. When the horizon follows an Erlang- $l$  distribution, the method provides a sequence of approximations that converges to the true finite-time ruin probability as  $l$  increases. Furthermore, the random horizon is easier to work with, so that very accurate probabilities of ruin are obtained with comparatively little computational effort. An additional section determines the phase-type form of the deficit at ruin in both models. Our work exploits the relationship to fluid queues to provide effective computational algorithms for the determination of these quantities, as demonstrated by the numerical examples.

**MSC:**

- 62P05 Applications of statistics to actuarial sciences and financial mathematics
- 91B30 Risk theory, insurance (MSC2010)
- 65C60 Computational problems in statistics (MSC2010)

Cited in **22** Documents

**Full Text:** [DOI](#)

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