

# Ruin Probabilities and (Exponential) Appell Polynomials

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## Abstract

We review some of the explicit (finite-time) ruin probabilistic results, recently obtained by the author in a series of joint papers with Ignatov and Dimitrova, in terms of classical and exponential Appell polynomials, under the assumption of Poisson or Erlang claim arrivals, dependent claim amounts with any joint distribution and non-linear premium income function. Special attention is paid to the appearance in the ruin probability formulas of classical and exponential Appell polynomials. Some new and known properties of the latter polynomials are summarized. It is further demonstrated that Appell polynomials naturally appear also in the explicit expressions for the joint distribution of the time of ruin, and the deficit at ruin. These new results are viewed as explicit representations of a finite-horizon generalization of the Gerber-Shiu function and are also applied in the context of optimal risk capital allocation.