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Asymptotic Expressions for the Haezendonck- Goovaerts Risk Measure with General Young Function

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In a recent paper Tang and Yang (2012), we implemented asymptotic analysis for the Haezendonck—Goovaerts (HG) risk measure with a power Young function for the Fréchet, Weibull and Gumbel cases. A key point of the implementation is that in equation (1.1) there, h can be explicitly solved for fixed x and q, which gives rise to the possibility to express the HG risk measure in terms of x and q. For a general Young function, however, this approach does not work anymore and the problem becomes a lot harder. In the present paper, we aim to extend the asymptotic analysis for the HG risk measure to the case with a general Young function. In doing so, we overcome several technical difficulties mainly due to the intricate relationship between the variables x, h and q.