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Abstract Submission

Title: Fourier-cosine method for Gerber-Shiu functions

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Abstract: In this talk, we introduce a systematic study on effectively approximating the Gerber-Shiu functions, which is a hardly touched topic in the current literature, by incorporating the recently popular Fourier-cosine method. Fourier-cosine method has been a prevailing numerical method in option pricing theory since the work of Fang and Oosterlee (2009). Our approximant of Gerber-Shiu functions under Lévy subordinator model has $O(n)$ computational complexity in comparison with that of $O(n \log n)$ via the fast Fourier transform algorithm. Also, for Gerber-Shiu functions within our proposed refined Sobolev space, we introduce an explicit error bound, which seems to be absent from the literature. In contrast with our previous work (Chau et al., 2015), this error bound is more conservative without making heavy assumptions on the Fourier transform of the Gerber-Shiu function. Further numerical studies will be included.

Keywords: Gerber-Shiu functions; Lévy subordinator; Fourier-cosine method; Sobolev embedding theorem; Harmonic analysis.