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Edgeworth expansions for smooth functions of standardized subordinators via differential calculus for linear operators[†]

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Abstract

We apply a differential calculus for linear operators, together with moduli of smoothness techniques, in order to obtain Edgeworth expansions for $E\phi(Z(t)) - E\phi(Z)$, where $(Z(t), t \geq 1)$ is a standardized subordinator, Z is a standard normal random variable and ϕ is a suitable smooth function. The main achievement of the method is to provide explicit upper bounds for the remainders, thus getting rid off the ‘big or little o ’ terms. Other features are the relative simplicity of the proofs and the property of monotonic convergence for $E\phi(Z(t))$ under simple sufficient conditions on ϕ .

Keywords: Edgeworth expansion, Berry-Esseen bounds, differential calculus, moduli of smoothness, subordinator.

MSC: Primary 60F05; Secondary 41A17.

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