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CONVERGENCE IN VARIATION OF THE JOINT LAWS OF MULTIPLE STABLE STOCHASTIC INTEGRALS

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Abstract: In this note, we are interested in the regularity in the sense of total variation of the joint laws of multiple stable stochastic integrals. Namely, we show that the convergence

$$\mathcal{L}\big(I_{d_1}(f_1^n),\dots,I_{d_p}(f_p^n)\big) \xrightarrow{\text{var}} \mathcal{L}\big(I_{d_1}(f_1),\dots,I_{d_p}(f_p)\big) \quad \text{as } n\to+\infty$$

holds true as long as each kernel f_i^n converges when $n\to+\infty$ to f_i in the Lorentz-type space $L^\alpha(\log_+)^{d_i-1}([0,1]^{d_i})$ for $1\le i\le p$. This result generalizes [4] from the one-dimensional case to the joint law case. It generalizes also [6] from the Wiener–It setting to the stable setting and [5] in the study of joint law of multiple stable integrals.

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