ON JOINT SUM/MAX STABILITY AND SUM/MAX DOMAINS OF ATTRACTION

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Abstract: Let $(W_i, J_i)_{i \in \mathbb{N}}$ be a sequence of i.i.d. $[0, \infty) \times \mathbb{R}$-valued random vectors. Considering the partial sum of the first component and the corresponding maximum of the second component, we are interested in the limit distributions that can be obtained under an appropriate scaling. In the case that W_i and J_i are independent, the joint distribution of the sum and the maximum is the product measure of the limit distributions of the two components. But if we allow dependence between the two components, this dependence can still appear in the limit, and we need a new theory to describe the possible limit distributions. This is achieved via harmonic analysis on semigroups, which can be utilized to characterize the scaling limit distributions and describe their domains of attraction.

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