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Results on generalized models and singular products of distributions in the Colombeau algebra $\mathcal{G}(\mathbb{R})$

Abstract: Models of singularities given by discontinuous functions or distributions by means of generalized functions of Colombeau have proved useful in many problems posed by physical phenomena. In this paper, we introduce in a systematic way generalized functions that model singularities given by distributions with singular point support. Furthermore, we evaluate various products of such generalized models when the results admit associated distributions. The obtained results follow the idea of a well-known result of Jan Mikusiński on balancing of singular distributional products.

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