

# Regular Maximal Monotone Operators and the Sum Theorem

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**Abstract:** In this note, which is a continuation of [17], we study two classes of maximal monotone operators on general Banach spaces which we call  $\mathcal{C}_0$  (resp.  $\mathcal{C}_1$ )-regular. All maximal monotone operators on a reflexive Banach space, all subdifferential operators, and all maximal monotone operators with domain the whole space are  $\mathcal{C}_1$ -regular and all linear maximal monotone operators are  $\mathcal{C}_0$ -regular. We prove that the sum of a  $\mathcal{C}_0$  (or  $\mathcal{C}_1$ )-regular maximal monotone operator with a maximal monotone operator which is locally inf bounded and whose domain is closed and convex is again maximal monotone provided that they satisfy a certain "dom-dom" condition. From this result one can obtain most of the known sum theorem type results in general Banach spaces. We also prove a local boundedness type result for pairs of monotone operators.

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