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10033. *A new derivative concept for set-valued functions.*

The power set of a linear space is not a linear space with respect to element-wise operations. In particular, the inverse of the addition is lacking. So, how should one define a difference quotient for a function mapping into such a power set? On well-defined subsets of the power set of a preordered linear space, a residuation operation can be used as a substitute for the difference, and corresponding (directional) derivatives and subdifferentials for convex set-valued functions can be defined. The max-formula, a fundamental existence result, and calculus rules for the new derivatives will be established. Our approach is fundamentally different from previous ones (see, for example, Aubin/Frankowska 1990) since the latter require to pick a point in the graph of the function, and they only work under restrictive assumptions. (Received September 21, 2011)