

Mixed hemivariational-like inequalities involving set-valued maps and applications

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In this talk we present some existence results for a nonstandard class of hemivariational-like inequalities involving set-valued maps and a (nonlinear) bifunction. The presence of the set-valued map ensures that not one, but two types of solution can be defined, while the presence of the bifunction does not allow the inequality to be written equivalently as an inclusion, making nonsmooth critical point theory unavailable. Using topological methods we are able to prove that our inequality possesses at least one solution (strong solution) provided the set-valued map is upper semicontinuous (lower semicontinuous, respectively). One of the main points of interest in our approach is that we are able to prove the existence of at least one solution even if the KKM technique fails, therefore some of our results are new even in the particular case when the problem reduces to a classical hemivariational, or variational inequality.

A nontrivial example for which our theoretical results are valid is also discussed. More precisely, we consider a differential inclusion involving the Φ -Laplacian and mixed boundary conditions whose variational formulation leads to a hemivariational-like inequality.

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