The Rothe Method for a Class of Nonautonomous, Nonmonotone Second Order Subdifferential Inclusions

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Abstract: We consider a Rothe method for a class of second order evolution subdifferential inclusions of nonmonotone type. The method consists in constructing a sequence of piecewise constant and piecewise linear functions being a solution of approximate problem. Our main result provides a weak convergence of a subsequence to a solution of exact problem. Under some more restrictive assumptions we obtain also uniqueness of exact solution and a strong convergence result. Such kind of mathematical problems arise in the study of dynamic viscoelastic models in Contact Mechanics. The main difficulty comes from the fact that the involved viscosity operator and the multivalued one are nonautonomous, namely they depend on the time variable explicitly. In this sense the presented result is a generalization of the previous one obtained by the author in [1].

References

[1] K. Bartosz, *Numerical methods for evolution hemivariational inequalities*, in W. Han et al. (eds), *Advances in Variational and Hemivariational Inequalities*, Advances in Mechanics and Mathematics 33, Springer International Publishing Switzerland 2015, p. 111-144.