Goeleven, D.; **Motreanu, D.**

Eigenvalue and dynamic problems for variational and hemivariational inequalities. (English)

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The following variational-hemivariational inequality has been considered:

$$\lambda \in \mathbb{R},\ u \in K : \langle Au - F(\lambda, u), v - u\rangle + J^0(u; v - u) \geq 0, \quad \forall v \in K. \tag{P}$$

As the main result it has been shown that on some hypotheses the solution set of (P), i.e.,

$$\Sigma = \{(\lambda, u) \in \mathbb{R} \times K : (\lambda, u) \text{ solves (P)}\},$$

contains a pair of unbounded subcontinua Γ^+, Γ^- emanating from $(0, 0) \in \mathbb{R}\times K$, lying in $\mathbb{R}_+ \times K$, $\mathbb{R}_- \times K$, respectively, that are closed. The proof has been established by making use of two different techniques. Firstly, by using the Rabinowitz abstract theorem on the existence of subcontinua and secondly, on the basis of the approach involving the Leray-Schauder degree.

The class of variational inequality problems of the form: Find $u \in D(u)$ such that

$$\langle Au + Bu - f, v - u\rangle + \varphi(v) - \varphi(u) \geq 0, \quad \forall v \in H,$$

with A maximal monotone and B completely continuous, has been considered taking into account the existence of solutions (the noncoercive case).

The obtained results have been applied to the electric heat generation problem, isothermal reaction models in enzyme kinetics and to a noncoercive parabolic variational inequality.

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MSC:

49J40	Variational inequalities
47J20	Variational and other types of inequalities involving nonlinear operators (general)
35K85	Unilateral problems for linear parabolic equations and variational inequalities with linear parabolic operators

Keywords:
recession mapping; variational-hemivariational inequality; noncoercive parabolic variational inequality