Bull. Korean Math. Soc. 23(1986), No. 2, p. 198

APPLICATIONS OF THE PHELPS-EKELAND PRINCIPLE

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In this dissertation we are much concerned about applications of maximal ordering principles and Caristi-Kirk-Browder fixed point theorem to the surjectivity of nonlinear maps defined on a Banach space.

In Chapter I we obtain the surjectivity theorem of locally c-expansive maps defined on a Banach space which is a generalization of W. A. Kirk and R. Schonberg's theorem.

In Chapter II we apply the Caristi-Kirk-Browder fixed point theorem to the surjectivity of locally strongly ϕ-accretive operators. Moreover we obtain the surjectivity theorem of generalized locally strongly ϕ-accretive operators which is a generalization of W. O. Ray and F. E. Browder's theorems.

In Chapter III we apply the above fixed point theorem to Altman's directional contractors. Furthermore, by applying Bae and Yie's localized formulation of the above fixed point theorem, we obtain a range of a closed nonlinear map with pointwise bounded directional contractors sharply. Finally we consider the Lion-Stampacchia's variational inequality in a Hilbert space. Then we can find some whereabouts of the unique solution via localizations of fixed points given by S. Park and T. E. Williamson.

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Thesis submitted to Seoul National University, December 1985. Degree approved February 1986. Supervisor: Professor Sehie Park.