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IMPROVEMENT TO CARISTI -EKELAND PRINCIPLE

Banach's Contraction Mapping Principle is remarkable in its simplicity, yet it is perhaps the most widely applied fixed point theorem in all of analysis. Although the basic idea was known to others earlier, the principle first appeared in explicit form in Banach's 1922 thesis where it was used to establish the existence of a solution to an integral equation.

A wonderful extension to Banach Contraction Mapping Principle was given by Caristi. The Caristi fixed point theorem has found many applications in nonlinear analysis. It is shown, for example, that this theorem yields essentially all the known inwardness results of geometric fixed point theory in Banach spaces. This theorem is amazingly equivalent to another fundamental theorem: Ekeland variational principle.

In this talk we will give an improvement of the above theorems via a characterization of the existence of minimal elements in partially ordered sets in terms of fixed point of multivalued maps.