Explicit and implicit control problems. A fixed point approach

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The talk is about a controllability principle for the *general control problem* related to operator equations of fixed point type. It consists in finding (w, λ), a solution to the following system

$$\begin{cases} w = N(w, \lambda) \\ w \in W, \ \lambda \in P, \ (w, \lambda) \in D \end{cases}$$

involving the fixed point equation $w = N(w, \lambda)$. Here w is the *state variable*, λ is the *control variable*, W is the *domain of the states*, P is the *domain of controls* and $D \subset W \times P$ is the *controllability domain* that gives expression to a certain condition/property imposed on w, or on both w and λ. Several examples of explicit and implicit control problems are given. Then there are presented techniques of solving control problems based on: basic fixed point principles; the vector method; and the method of lower and upper solutions.

The presentation involves recent works of the speaker and of his collaborators.

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