Jindřich Nečas, Charles University, Prague, Czech Republic
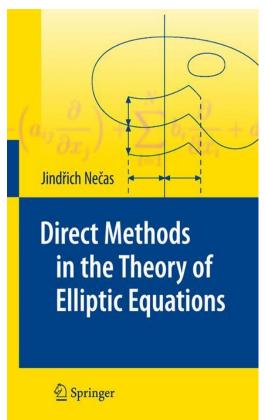
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Nečas's famous book *Direct Methods in the Theory of Elliptic Equations* has become standard reference material on the mathematical theory of linear elliptic equations and systems, and also on the related function spaces framework. It provides a concise and self-contained introduction to the modern theory of partial differential equations, the theory of weak solutions and related topics. It is recommended to scientists working in the field of partial differential equations, postgraduate and graduate students, and applied mathematicians. The first chapter is devoted to directs methods, introduction to the Sobolev spaces, weak solution, Lax-Milgram theorem, Galerkin methods and spectral theory. The second chapter deals with the basic properties of Sobolev spaces (imbeddings, traces, compact imbeddings, fractional spaces).The third chapter contains existence and uniqueness theorems for problems, including the Fredholm alternative and systems of equations with variable coefficients. The next chapter describes regularity properties of weak solutions. Chapter 5 deals with applications of Rellich's inequality and Chapter 6 introduces the Sobolev spaces with weights. Finally the last chapter studies regularity of solutions and their dependence on coefficients and also on irregular domains.

Originally published in 1967 in French, the present English edition provides some updates.

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