FINITE ELEMENT METHODS AND ANALYSIS FOR ELLIPTIC PROBLEMS IN NON–DIVERGENCE FORM

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ABSTRACT. The finite element method is a powerful and ubiquitous tool in numerical analysis and scientific computing to compute approximate solutions to partial differential equations (PDEs). A contributing factor of the method's success is that it naturally fits into the functional analysis framework of variational models. In this talk I will discuss two classes of finite element methods for problems that do not conform to the usual variational framework, namely, elliptic PDEs in non–divergence form. I will first present the derivation of the schemes and give a brief outline of the convergence analysis. Finally, several challenging numerical examples will be presented showing the robustness of the method as well as verifying the theoretical results.

Keywords: non–divergence form, elliptic PDE, finite element method, convergence analysis

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