PhD research topic proposal
BME, Doctoral School of Mathematics and Computer Science

Name and degree of supervisor:

János Karátson, Professor.

Are you willing to supervise Stipendium Hungaricum applicants?

Yes

Title of the topic: Maximum principles and related properties for diffusion type PDEs

Short description:

Maximum principles and related qualitative properties are important measures of the validity of the mathematical or numerical model of real-life phenomena. Such typical properties for elliptic and parabolic partial differential equations (PDEs) are maximum–minimum principles, nonnegativity or nonpositivity preservation and maximum norm contractivity. These properties have been explored recently for certain types of PDEs. The goal of this research is to establish related results for various further PDE models, such as convection-reaction diffusion equations involving nonsymmetric terms, systems of PDEs of the above type, and problems with boundary nonlinearities. Both the PDE model and its finite element (FEM) solutions should be analyzed.

Requirements: A solid background in the theory and numerical methods for partial differential equations. Programming skills in Matlab. A good level of English knowledge.

Contact:

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Place of work:

Department of Analysis, Institute of Mathematics, BME