

Analytical and Numerical Methods in Differential Equations (Yanenko 105)

A virtual conference on occasion of the 105th birthday of
Academician Nikolai N. Yanenko

March 23-27, 2026

BOOK OF ABSTRACTS



Virtual Host:

School of Mathematics and Geoinformatics
Suranaree University of Technology
Nakhon Ratchasima, Thailand

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Fuzzy Finite Element Method for Uncertainty Modelling

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Fuzzy numbers are used in the Fuzzy Finite Element Method (FFEM) to represent input uncertainties like stresses and material characteristics. A set of acceptable values limited by its membership function is defined by each fuzzy parameter. FFEM ensures deterministic coverage of uncertainty by adhering to the set-based uncertainty concept that was put forth by Lotfi A. Zadeh. Without making any assumptions about probability distributions, the aim of FFEM is to assess the structural response for any possible combination of these functional inputs. Through the decomposition of fuzzy parameters into α -level intervals and interval optimization over the resulting Cartesian product of admissible input domains, the Fuzzy Finite Element Method systematically evaluates all admissible combinations of uncertainty, ensuring comprehensive coverage of physically possible system configurations. ϵ .

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