



National Center for Mathematics

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Advanced Training in Mathematics Schools

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(Supported by National Board for Higher Mathematics)



Workshop (offline) on Finite Element Methods for PDEs

Venue: School of Mathematics, IISER Thiruvananthapuram, Kerala 695551

(September 11 – 16, 2023)

This workshop offers an introduction to finite element methods for elliptic boundary value problems. The course starts with a brief introduction to Sobolev spaces and details on some abstract variational problems, examples for elliptic problems, and the regularity of weak solutions. Conforming and discontinuous Galerkin finite element methods are introduced for the Poisson and Stokes problems, and error estimates will be discussed. The aim is to focus on both abstract theory and implementation aspects. Hands-on computation using numerical softwares will be one of the key features. This workshop is intended for PhDs, Postdocs, and scientists so that they can learn these techniques and use them in their research.

PRE-REQUISITES: Knowledge of classical and modern PDE's, numerical analysis, and functional analysis.

ORGANIZERS



Prof. Neela Nataraj
Institute Chair Professor,
Department of Mathematics,
Indian Institute of Technology Bombay
Powai, Mumbai, India - 400076

email: neela@math.iitb.ac.in

<http://www.math.iitb.ac.in/~neela>



Dr. Nagaiah Chamakuri
Assistant Professor, School of Mathematics
IISER Thiruvananthapuram
Kerala, 695551, India.
Office Phone : +91 471 2778260

email: nagaiah.chamakuri@iisertvm.ac.in

<https://www.iisertvm.ac.in/faculty/nchamakuri>

SPEAKERS / LECTURES



Overview of Weak derivatives,
Sobolev spaces and
embeddings, Poincare
inequality, Dual spaces, trace
spaces.

Sheetal Dharmatti, Asst. Professor,
School of Mathematics, IISER TVM



Some abstract variational
problems (Stampacchia, Lax
Milgram, Babuska Brezzi),
Examples of elliptic problems,
Regularity of weak solutions

S. Kesvan, Professor, The Institute of
Mathematical Sciences, Chennai



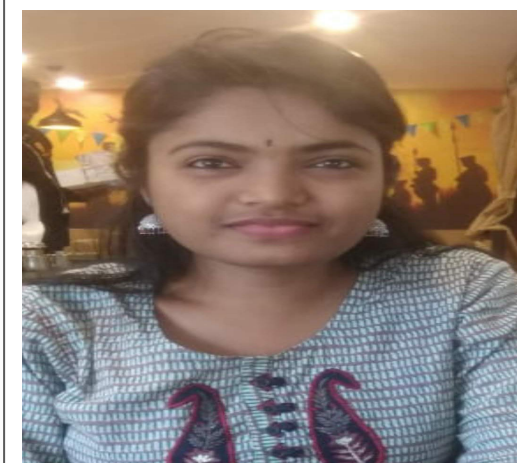
Conforming, Mixed FEM,
dGFEM for second order
elliptic equations,
Interpolation, and
approximation, Error
estimates.

Neela Nataraj. Professor, Department
of Mathematics, IIT Bombay



Discretization of Poisson's
problem. Aspects of FEM
implementation, including
various boundary conditions,
and solution of the discretized
system.

Nagaiah Chamakuri, Asst. Professor,
School of Mathematics, IISER TVM



Stokes Problem- Mixed FEM
formulation, Error
estimates. Aspects of
efficient implementation.

Asha K. Dond, Asst. Professor,
School of Mathematics, IISER TVM

GENERAL INFORMATION

Last date for receiving the online registration forms:

August 13, 2023

Number of Participants:

50 (40 outstation and 10 local)

The list of selected applicants will be published in web page after one week of last date of submission.

MORE DETAILS

The web page of this program will be:

<https://www.atmschools.org/school/2023/NCMW/femp>

Application form and other information about the program are available on the above webpage.