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Online Teacher's Enrichment Workshop (TEW) on "Differential Equations and its Applications"
by Deshbandhu College, University of Delhi, Kalkaji, New Delhi.
(March 15 - 28, 2021)

(INSA - NCM joint programme)

The Teacher's Enrichment Workshop is a programme funded by the National Centre for Mathematics (A joint centre of TIFR & IIT Bombay). The TEW is meant for college teachers to revisit and update their content-knowledge. The lectures in this workshop cover specific topics which are relevant for the teachers' classroom instructions. An important component of this programme is the discussion hour during which the teachers will have opportunities to get their doubts cleared and work-out routine to advanced exercises.

ORGANIZERS:

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Speaker: V.D. Sharma, Professor, IIT Gandhinagar

Method of characteristics and general solution of first order PDEs, Riemann problem, Conservation laws and Burger's Equations, Cauchy problem for second order PDEs. First order Ordinary Differential Equations, growth and decay model, Euler's Equation, Power series solution of a Differential Equation about an ordinary point, Solution about a regular singular point.

Speaker: Rashmi Bhardwaj
Professor, GGSIP Univ., Dwarka, New Delhi

Non-linear Autonomous systems, Fixed Point, Saddle Point, Hopf Bifurcation, Equilibrium Points and their local stabilities, Cycles, Lyapunov Function, Chaos, Lyapunov Exponent.

Speaker: Navnit Jha, Associate Professor, SAU, New Delhi

Introduction to Radial Basis Functions (RBFs): Thin plate spline, Piecewise smooth RBFs, Generalized Duchon spline, Infinitely smooth RBFs, Gaussian (GA), Multiquadric, Inverse multiquadric, Inverse quadratic. Multi-dimensional scattered mesh generation. Derivative approximations using various RBFs. Computational discretization for the first and second derivatives in one dimension, and two-dimensions. Error analysis and derivation of optimal shape parameters. Convergence theory associated with local RBF method. A convergent radial basis scattered mesh high-resolution compact FDM for boundary layer problems.

Speaker: Malay Banerjee, Professor, IIT Kanpur

General solution of system of nonlinear equations, Putzer algorithm to calculate exap(At), stable-unstablecenter subspaces, stable manifold theorem, Hartman Grobman theorem. Local and global bifurcations, normal forms, mathematical criteria for saddle-node, trans-critical, pitchfork, Hopf and Bogdanov-Takens bifur-cations. Ordinary differential equation models of single species population growth, two and multi-species interactions. Application of bifurcation theory to study various dynamics produced by the nonlinear ordinary differential equation models.

Speaker: Kapil Sharma, Professor, SAU, New Delhi

Evolution of numerical methods for initial value problems: Development and analysis of continuous approximate methods for IVP; Development and analysis of discretization methods, which include single and multi step methods for IVP.

Contact Details:

The web page of this program will be: **https://www.atmschools.org/2021**

Application form and other information about the programme are available on the above website.

Applications can be sent by mail at : **harindri20dbc@gmail.com**