



HBNI

Alumni Webinar

**Friday,
25 September 2026
at 14:00 hrs**

Venue:

**Conference Hall ,
First Floor, New Training
School Complex,
Anushaktinagar,
Mumbai**

Link for : -

YouTube:

https://youtube.com/live/Pxw91c69Kp8?feature=s_hare

Webex :

<https://hbni.webex.com/hbni/j.php?MTID=mdb71985cd7e1f7e1a9c5394199bb1436>

Dr. Ritesh Sugandhi

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Associate Professor – HBNI, Mumbai



"Particle Swarm Optimization - Computational Intelligence approach learned from Nature"

Dr. Ritesh Sugandhi is a Scientific Officer-G at the Institute for Plasma Research (IPR), Gandhinagar, and an Associate Professor at Homi Bhabha National Institute (HBNI), Mumbai. He holds a PhD in Engineering Sciences from HBNI and has over 25 years of experience in scientific and technological projects of national importance, including ADITYA and SST-1 at IPR.

He has also undertaken international assignments at ITER and the Tore Supra tokamak in France. Currently, he is associated with the LIGO-India project. His areas of expertise include data acquisition and control systems, numerical mathematics, process control, automation, intellectual property rights, and research methodology. He is also actively involved in teaching and academic activities at HBNI.

Abstract

Numerical optimization plays a fundamental role in computational science and engineering, with applications ranging from system design and scheduling to data analysis and control. While classical optimization methods are highly effective for many problems, they can become challenging when the objective functions are non-differentiable, non-continuous, computationally expensive, or characterized by multiple local minima and complex constraints.

This talk introduces Particle Swarm Optimization (PSO), a nature-inspired computational intelligence technique based on the collective behaviour of swarms such as birds and fish. PSO searches for optimal solutions through a population of candidate solutions that iteratively improve their positions based on individual experience and information shared within the swarm. Its simple computational framework and gradient-free nature make it attractive for a wide range of complex optimization problems.

The talk will provide an overview of numerical optimization and nature-inspired algorithms, followed by an exploration of PSO and its applications to scientific and engineering problems. Selected examples will be used to illustrate its effectiveness, challenges, and potential for solving complex optimization problems.

All are cordially invited for in person attendance