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SS-25: Optimisation and Decision Frameworks for Resilient and Sustainable Infrastructure under Deep Uncertainty

Gaurav Datta¹ and Giuseppe Carlo Marano²

¹ Independent Researcher

² Polytechnic of Turin, Italy

gdattagdatta@gmail.com; giuseppe.marano@polito.it

Description

As infrastructure faces growing challenges from climate variability, degradation, and resource limitations, the integration of decision-making and optimisation frameworks has become vital. This session aims to explore optimisation and decision-making strategies for resilient and sustainable infrastructure systems under deep uncertainty. It integrates probabilistic modelling, resilience engineering, and data-informed decision frameworks to support robust and adaptive design. By bridging theory and practice, the session advances cross-disciplinary collaboration in reliability-informed, sustainability-driven engineering design.

The session will promote interdisciplinary approaches for resilience assessment, introduce AI-assisted and surrogate-based methods, and provide applications for climate-resilient infrastructure systems. These contributions align with ESREL's mission to advance reliability and risk-based decision-making for a sustainable built environment.

Topics of Interest

- Multi-objective and robust optimisation for systems under uncertainty
- Performance-based and reliability-based optimisation methods
- Stochastic optimisation and risk management strategies
- Optimal decision-making in uncertain environments
- Machine learning techniques and surrogate models for efficient optimisation
- Data-driven optimisation for improving system performance and resilience