

RAM&PHM 4.0: Advanced methods for Reliability, Availability, Maintainability, Prognostics and Health Management of industrial equipment

18.11.2024 Enrico Zio

Course Program

Monday: 18 November 2024 **OPENING OF THE COURSE** 9:00 – 9:15: Introduction to the Course. E. Zio 9:15 – 10:30: Reliability, Availability, Maintainability, Prognostics and Health Management. E. Zio

FAULT DETECTION 11:00 – 13:00: *Fault Detection methods*. I. Ahmed

14:15 – 16.15: Exercise Session (MATLAB/PYTHON needed). G. Floreale

FAULT DIAGNOSTICS (1) 16:30 – 18:00: *Fault diagnostics methods*. J. Figueroa

<u>Tuesday: 19 November 2024</u> **MONTE CARLO SIMULATION** 9: 00–10:30: Monte Carlo simulation for system reliability and availability analysis. E. Zio 10:45 – 12:45: *Exercise Session (MATLAB/PYTHON needed)*. L. Pinciroli

FAULT DIAGNOSTICS (2) 14:00 – 16:00: *Exercise Session (MATLAB/PHYTON needed)*. J. Figueroa

ADVANCED TOPICS IN PROGNOSTICS AND HEALTH MANAGEMENT (1) 16:30 – 18:00: *Advanced topics in Fault Detection and Diagnostics*. P. Baraldi

<u>Wednesday: 20 November 2024</u> **FAULT PROGNOSTICS** 9:00–10:30: *Fault prognostics methods*. P. Baraldi

ADVANCED TOPICS IN PROGNOSTICS AND HEALTH MANAGEMENT (2)

11:00 – 12:30: Challenges in RAM&PHM4.0. P. Baraldi, E. Zio 14:00-17:30: Advanced topics in Fault Diagnostics and Prognostics (MATLAB*/PHYTON needed). I. Ahmed



Laboratory of Analysis of Systems for the Assessment of Reliability, Risk and Resilience (LASAR³)



Ibrahim Ahmed (PhD, Assistant Professor) research activity is on modeling, simulation, data analytics, machine learning, artificial intelligence for Prognostics and Health Management (PHM) and maintenance, and for safety, security, risk, resilience assessment and management.



Piero Baraldi (PhD, Full Professor) is the principal investigator of the projects on modeling, simulation, data analytics, machine learning, artificial intelligence for Prognostics and Health Management (PHM) and maintenance.



Francesco Di Maio (PhD, Associate Professor) is the principal investigator of the projects on modeling, simulation, data analytics, machine learning, artificial intelligence for safety, security, risk, resilience assessment and management.



Enrico Zio (PhD, Full Professor) is the scientific director of the research and development activities carried out by LASAR.

Collaborators:

- 4 Post-doc
- 18 PhD students
- 13 Master Students
- 26 Visiting

Main Intervention Areas



Approach



Simulation, Modeling, Analysis, Research for Treasuring Knowledge, Information and Data

Laboratory of Analysis of Systems for the Assessment of Reliability, Risk and Resilience (LASAR³)

