IX International Summer School on Fault Diagnosis of Complex Systems

Girona, 4-8 July 2022

https://exit.udg.edu/summerschool/

Organised by:

Universitat de Girona

Universidad de Valladolid

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

UNIVERSIDAD DE SEVILLA

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Presentation

Welcome to the 9th edition of the International Summer School on Fault Diagnosis of Complex Systems (ISS/FDCS) that will take place at the Escola Politècnica Superior of the University of Girona during the dates 4th-9th of July 2022 in Girona, (Catalunya, Sp.)

Automated diagnosis of devices and systems is a very interesting and active research and development field that can be approached with different techniques (i.e. knowledge-based systems, case-based reasoning, data-driven methods including machine-learning or model-based reasoning) developed in different fields: Control Engineering, Artificial Intelligence or Statistics. This intensive one-week course will tackle these different perspectives including both theory lectures and practical exercises focused on application problems.

The ISS/FDCS is conceived as an intensive seminar, oriented to postgraduates (PhD/MSc students) interested on the topic. The courses will take place during a week where you will learn and share experiences with other PhD/MSc students, researchers and practitioners in the field. The main goal is to introduce students to different diagnosis approaches providing the vision of experts in the field that have developed their careers in different research communities including Control Engineering, Artificial Intelligence and Statistics.

Methods and techniques exposed in the course have been applied with success in many domains, including electronic circuits, chemical and industrial processes, automotive, power distribution, satellites or software development.

Organisation

Local organising committee: Joaquim Meléndez, Joaquim Armengol and Joan Colomer (Universitat de Girona, Catalonia, Spain)

School Steering Committee: Belarmino Pulido and Anibal Bregon (University of Valladolid, Spain)

Special Guests: Marina Zanella (Università degli Studi di Brescia, Italy), Yannick Pencolé (LAAS-CNRS, France) and Louise Travé-Massuyès (LAAS-CNRS, France)

Academic Staff: C. Alonso (U. Valladolid), J. Armengol (U. Girona), A. Bregón (U. Valladolid), M.J. de la Fuente (U. Valladolid), R. M. Gasca (U. Sevilla), M. Teresa Gómez (U. Sevilla), J. Meléndez (U. Girona), V. Puig (UPC), B. Pulido (U. Valladolid).

Tentative Program

T1. INTRODUCTION. FUNDAMENTAL CONCEPTS
T1.1 Definitions: fault, failure, detection, diagnosis, reliability...
T1.2 Foundations for fault detection and diagnosis in FDI and DX: detectability, observability, diagnosability...

T2. THE FDI APPROACH
T2.1. Structural analysis and analytical redundancy.
T2.2. Model-based detection methods: parameter estimation, parity equations, state observers for linear and non-linear models.
T2.3. Fault detection: residual evaluation by consistency tests, and envelope generators.
T2.4. Fault isolation: structured and directional residuals.

T3. THE DX APPROACH
T3.1 Model-based diagnosis from AI Community. Consistency-based diagnosis, CBD: Theoretical (Reiter's) approach.
T3.2 GDE: the computational approach to CBD.
T3.3 Computational alternatives to GDE. Diagnosing multiple faults.
T3.4 Constraint-driven fault diagnosis.

T4. DIAGNOSING BUSINESS PROCESSES
T4.1 Introduction to BPM
T4.2 BP Lifecycle and special characteristics
T4.3 The future

T5. PROGNOSIS
T5.1 Introduction to prognosis
T5.2 Understanding the prognosis problem
T5.3 Prognosis methods
T5.4 Challenges and applications

T6. SOFTWARE DIAGNOSIS

T7. STATISTICAL APPROACHES TO FAULT DIAGNOSIS
T7.1. Fault diagnosis using statistical methods.

T8. BRIDGE: INTEGRATION OF FDI AND DX APPROACHES
T8.1 Theoretical links and comparison.
T8.2 Practical comparison and potential synergies.

T9. DISCRETE EVENTS SYSTEMS DIAGNOSIS
T9.1. Distributed DES modeling
T9.2. Approaches to DES diagnosis
T9.3 DES diagnosability

Schedule

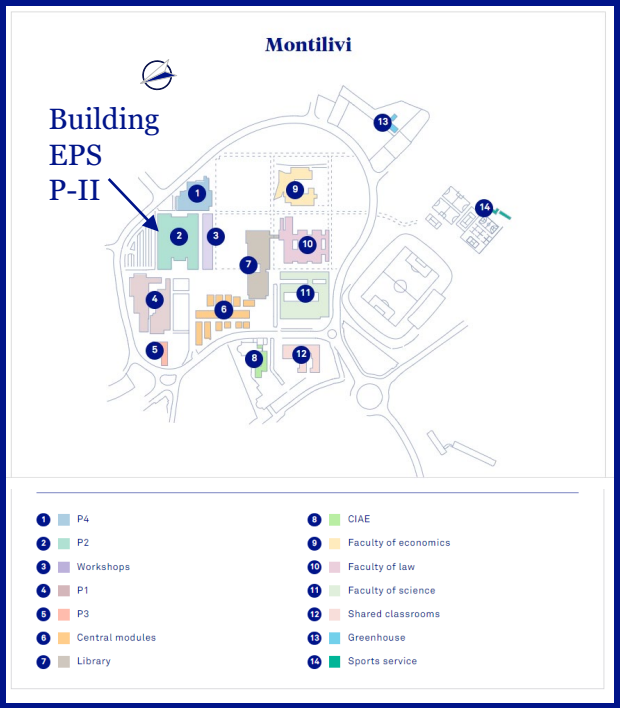
Time	Monday	Tuesday	Wednesday	Thursday	Friday
09:00-10:30		T2. FDI Approach	T3. AI-DX Approach	T6. Software diagnosis	T5- Prognosis
10:30-11:00	Opening				
11:00-11:30	Coffee Break	Coffee Break	Coffee Break	Coffee Break	Coffee Break
11:30-12:30	T1. MBD Fundamentals	T2. FDI Approach	T3. AI-DX Approach	T9. Discrete event systems	T8. BRIDGE
12:30-13:30					
13:30-15:00	Lunch	Lunch	Lunch	Lunch	Lunch
15:00-16:30	T2. FDI Approach	T7. FDI based on statistical models	T3. AI-DX Approach	T9. Discrete event systems	
16:30-17:00	Coffee Break	Coffee Break	Coffee Break	Coffee Break	
17:00-18:00	T2. FDI Approach	T7. FDI based on statistical models	T4. Diagnosing Business Processes	T9. Discrete event systems	

Location

This ninth edition will take place on July, 4th to 8th, 2022 in the city of Girona, Catalonia, Spain.

The teaching will take place at the Escola Politècnica Superior, Campus de Montilivi.

Building : P-II
Room: PII-09



Information

Dates
School: July, 4th to 8th, 2022

Registration Fees
Registration fees include attendance at ISS/FDCS courses, lunch (not dinner) from Monday to Friday and coffee-breaks:

- Early registration: before May, 31st: 500 euros.
- Late registration: after May, 31st: 750 euros.

Registration details: https://exit.udg.edu/summerschool/

Venue
This edition of the School will take place at the Escola Politècnica Superior, P2, Aula II-09, Campus Montilivi. (Girona)

Accommodation (suggestion):

Residència Campus de Montilivi Girona.
Address: Carrer Mercè Rodoreda i Gurgui, 2, 17003 Girona, Catalonia, Spain
(please indicate Diagnosis School).
montilivi@resa.es, +34 972 58 82 00
Web

Bus lines and timetable to get to the campus

Lines and timetables of the Transports Metropolitans del Gironès (click here):
From Train station to Montilivi Campus: L8
From City Center to Montilivi Campus: L11
From city center to Residence : L1

How to get here?

Barcelona- el Prat Airport: The airport is approximately one hour away from Girona. Trains run every 30 minutes from the airport to Barcelona-Sants train station (R2 Nord). Also, there are bus services (Sagalés Company) from Barcelona Airport to Girona City.
Girona- Costa Brava Airport: Located 12 kilometers from the centre of Girona and easily accessible by public transport (Sagalés Company).
Renfe: You will find regional, medium distance and high speed AVE/AVAST trains that travel from BCN-Sants station to Girona.
For more information: click here