PhD Course of the Industry 4.0 PhD Program of Politecnico di Bari and University of Bari

Decisions and Control within Renewable Energy Systems

Prof. Jan JANTZEN, University of the Aegean at Chios Island, Greece, jj@inference.dk

Language of instruction: English

ECTS points: 2 (20 hours)

Scope and form: Lectures, exercises, and group work

Duration: 6 weeks (May-June 2022, see schedule below)

Type of assessment: All assignments must be completed, and a multiple-choice written exam (possibly online) passed with a score above 50 percent.

Aid: Any material is allowed at the multiple-choice exam.

Recommended prerequisites: Basic knowledge of programming (for instance Matlab), basic knowledge of matrix algebra, basic knowledge of formal logic. Knowledge of control theory is *not* required.

Learning objectives

1. To understand and experience fundamental theory for modelling purposes
2. To apply solutions to practical problems within renewable energy and climate

Core elements: dynamic systems, feedback loops, least squares data modelling, cash flow analysis, fuzzy logic, fuzzy clustering.

Key concepts: renewable energy cases (photovoltaics, battery storage, wind turbines, ground source heat pump, district heating), financial decisions, civic engagement, computational intelligence, planning for climate emissions reductions, sociotechnical transition to a climate neutral community, population model, 'culture and technology together' in summary.

Course literature: The students will be provided with technical literature, free of charge, during the course.

Course schedule: The course will be held at LABIT (Aula Lab1) on the following days:

May 3rd 2 pm-5 pm

May 5th 2 pm-5 pm

May 10th 2 pm-5 pm

May 12th 2 pm-5 pm

May 31st 2 pm-5 pm

June 21st 2 pm-5 pm

June 23rd 2 pm-5 pm

Prof. Jan Jantzen has a background in electrical engineering, software systems, and renewable energy.

Biography. SONAR corporal in the submarines 1972 – 1974; MSc in electric power engineering, Technical University of Denmark (DTU), 1979; PhD in Systems Science, DTU, 1982; computer systems developer at LK-NES, 1979 – 1982; visiting researcher at Queen's University, Canada, 1982 – 1983; computer systems developer at Simcorp 1984 – 1985; visiting researcher at IBM Watson research center, New York, 1986; assistant professor of automatic control at DTU 1986; associate professor at DTU 1990; part-time consultant at Swedish power company Sydkraft 1993 – 1995; resigned from DTU 2008; engineer at the Samso Energy Academy 2008 until present. Adjunct Professor at the University of the Aegean at Chios Island, Greece, 2013 until present. Author of Foundations of Fuzzy Control, Wiley, 2007, 2nd ed. in 2013.

[Jan Jantzen - Google Scholar](#)