3.3.q Course Module on 3rd Semester: Fault Tolerant Control

Title
M3-17 Fault Tolerant Control/Fejltolerant regulering

Prerequisites
The module is based on knowledge achieved when studying courses on non-linear control theory and multi-variable control.

Objective
Students who complete the module should:

Knowledge
- Have comprehension of the fundamental concepts, terms and methods used within fault tolerant control
- Have comprehension of failure mode and effect analysis (FMEA)
- Have comprehension of modelling faults in dynamic systems and closed loop control systems
- Have comprehension of analytical redundancy
- Have knowledge about statistical fault detection including cumulative sum and generalised likelihood tests
- Have comprehension of residual generation for detection and isolation and decision ruling
- Have comprehension of fault detection using both observers and parity methods

Skills
- Be able to use analyse fault development and mitigation approaches
- Be able to list considered faults, how they propagate through the system and assess their severity and occurrence likelihood
- Be able to design fault detection observers
- Be able to design fault detection with parity equations
- Be able to design a FDI observer for unknown inputs
- Be able to develop fault tolerant strategies for ensuring the continuation of the system in the presence of faults
- Be able to design both passive and active fault tolerant controller for continuous systems

Competences
- Be able to account for the considerations involved in the process of formulating and solving fault tolerant control problems, choosing suited approaches and implementing it in practice
- Be able to develop fault detection and isolation (FDI) algorithms

Type of instruction
The form(s) of teaching will be determined and described in connection with the planning of the semester. The description will account for the form(s) of teaching and may be accompanied by an elaboration of the roles of the participants (see chapter 3).

Examination format
Internal written examination in accordance with the rules in the Examination Policies and Procedures, Addendum to the Joint Programme Regulations of Faculty of Engineering and Science, Aalborg University.

Assessment criteria
As stated in the Joint Programme Regulations.