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Fault-Tolerant Control Methods for Dynamic Systems based on

Intervenant
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Faults or failures such as defects in components, instruments, controllers and/or control loop can cause undesired reactions and consequences such as damages to technical parts of the plant, to human life or to the environment. Traditionally, the objective of a Fault Tolerant Control System (FTCS) is to maintain its current performance close to the desired one and preserve its stability conditions despite of component and/or instrument faults; in some circumstances a reduced performances may have to be accepted as a trade-off leading to a sub-optimal outcome.

Design of control systems to achieve fault-tolerance for closed-loop control of safety-critical systems has been an active area of investigation for many years. It becomes clearer and clearer that there are certain trade-off between achievable normal performance and fault-tolerance capability. However, despite of the many efforts in control community, most of the contributions did not consider or take into account the reliability of components, algorithms or soft computing structures to guarantee such performance and to reduce the gap between nominal and faulty case.

This talk aims at presenting new and innovative research results on how to design Fault Tolerant Control Systems with particular attention to consider and combine reliability analysis in the design procedure and/or real-time control synthesis. Current and future research is presented in order to solve the above challenging research problems devoted to safety-critical systems.