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Modélisation des systèmes à criticités mixtes sous forme d'un jeu à deux joueurs

Modeling mixed criticality systems as a two player game

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Mots clés : Systèmes à criticité mixtes, Théorie des jeux.

1. Context

A mixed criticality system is a system that integrates functionalities of different criticalities on the same execution platform. High-criticality functionalities are typically related to applications that must meet strict certification requirements, while lower-criticality functionalities are functionalities with less stringent certification requirements. To avoid interference between applications of different criticalities, conventional methods use temporal or spatial isolation between applications, however, this isolation can lead to space and time inefficient use of the execution platform.

The challenge in the mixed-criticality real-time scheduling problem is to propose real-time task scheduling algorithms that ensure that the system is safe while using the execution platform efficiently.

2. Objectives

In this project, we propose to use a new approach for solving the scheduling problem of mixed criticality systems. In this approach, we model the real-time scheduling problem of mixed-criticality systems as a two-player game and use the winning strategy of this game, if it exists, as an adaptive scheduling algorithm for scheduling the mixed-criticality system.

The project is divided into two phases.

Phase 1: Modeling the scheduling problem as a two-player game problem and modeling the winning strategy as an adaptive scheduler.

Phase 2: Implementation and test of the scheduler on a real platform using a real-time OS.

Bibliographic references

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