

Abstract

The goal of this work is to analyze and check the timing correctness of real time systems. In a real-time system all the tasks must respect precise timing constraints.

We created a tool software called “Schedanalyzer” to collect the real-time system characterizations and data from the hardware device and analyze them to check the system schedulability. After this temporal analysis the tool reports if the real-time system is schedulable or not, and how large is the temporal margin.

The chosen methodology is based on a well-known algorithm.

The realized tool can also automatically optimize the system through the interchange of the priority values of the tasks to maximize margins.

The software can also help the users to improve or verify the timing system correctness through a viewer that shows how the system has been really scheduled by the hardware device.

It’s possible to simulate a real-time system editing the data relative to the tasks that composes it and then verifies its schedulability.

Several tests were performed to check the system schedulability analysis and automatic optimization of schedulability margin. The results show that the analysis is correct and in most of the cases the automatic optimization brings to better margin of schedulability.

The tool is currently used by ASF (Ansaldo Segnalamento Ferroviario).