literature review is a review of “Response-Time Analysis of Engine Control Applications Under Fixed-Priority Scheduling” paper by Alessandro Biondi, Marco Di Natale, and Giorgio Buttazzo.

Introduction:

The goal in this project to analyze the presented proposal in the paper of techniques of scheduling of engine-dependent tasks (Adaptive Variable Rate task model) while putting physical constraints of such tasks into consideration. Such tasks will be scheduled under fixed-priority scheduling since engine control tasks are not suitable to be scheduled by sporadic or periodic task models. In addition, we also aim to do timing analysis of Adaptive Variable Rate tasks which can be very complicated since the worst-case execution time of such task differ between different modes of operation.

\[ \rho U = U' \]

where \( U' \) is the utilization of the AVR tasks and \( U \) is the utilization of the periodic/sporadic tasks, and \( \rho \) is the ratio of the two utilizations. Over 500 arbitrarily created task sets were used to test the schedulability. Figure 3 below shows the schedulability ratio versus the utilization where the utilization ratio \( \rho \) is 0.4. In the figure the utilization changes from 0.3 to 0.95. We can see from the figure that as the utilization increases and thus the load of the system increases, the schedulability of the system decreases. Figure 4 is a same type of experiment except for that the utilization ratio \( \rho \) is 0.6.

A number of experiments have been performed. The purpose of the first experiment was to measure the schedulability ratio with respect to the utilization of the periodic/sporadic tasks and the AVR tasks. \( U' \)
Experiment three was similar to experiment one and two in that it is set to measure the schedulability ratio. The difference in this experiment is that the number of modes of the AVR tasks changes and the utilization of the periodic tasks stays constant as well as the utilization ratio between the AVR task set and the periodic tasks. Same as the previous experiment, the schedulability ratio increases for some tasks and decreases for some.

(c) $U = 0.85$

(d) $U = 0.85, \rho_u = 0.4$