

# Response-Time Analysis for Self-Suspending Tasks Under EDF Scheduling (Artifact)

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## — Abstract —

This artifact provides the means to validate and reproduce the experimental results presented in the related paper “Response-Time Analysis for Self-Suspending Tasks Under EDF Scheduling”. The paper introduces a response-time analysis for constrained-deadline self-suspending tasks scheduled under EDF on a uniprocessor system, based

on a model transformation from self-suspending sporadic tasks to sporadic tasks with jitter. In the experimental evaluation presented in the paper, the performance of the proposed analysis approach for self-suspending tasks is compared with that of existing suspension-oblivious and suspension-aware analysis techniques.

**2012 ACM Subject Classification** Computer systems organization → Real-time systems; Software and its engineering → Real-time schedulability

**Keywords and phrases** Real-Time Systems, Schedulability Analysis, Self-Suspending Tasks, EDF Scheduling

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**Related Article** Federico Aromolo, Alessandro Biondi, and Geoffrey Nelissen, “Response-Time Analysis for Self-Suspending Tasks Under EDF Scheduling”, in 34th Euromicro Conference on Real-Time Systems (ECRTS 2022), LIPIcs, Vol. 231, pp. 13:1–13:18, 2022.

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## 1 Scope

This artifact allows reproducing the experimental results presented in the related paper “Response-Time Analysis for Self-Suspending Tasks Under EDF Scheduling”, which introduces a response-time analysis for constrained-deadline self-suspending tasks scheduled under EDF on a uniprocessor system, based on a model transformation from self-suspending sporadic tasks to sporadic tasks with jitter. The source code provided in the artifact includes an implementation of the proposed analysis approach and of other existing suspension-oblivious and suspension-aware analysis techniques for the purpose of reproducing the results of the experimental comparison presented in the paper. The resulting program can also be utilized to perform the evaluation with other system configurations than those selected for presentation in the paper.

## 2 Content

The artifact package includes the following files:

- `instructions.txt` – text file containing instructions on how to compile the provided source code, reproduce the experiments in the paper, and perform the evaluation with other system configurations;



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## 5:2 Response-Time Analysis for Self-Suspending Tasks Under EDF Scheduling (Artifact)

- `dss_other.cpp`, `dss_other.h`, `dss_rta.cpp`, `dss_rta.h`, `experiments.cpp`, `experiments.h`, `main.cpp`, `models.cpp`, `models.h`, `rta.cpp`, `rta.h`, `test.cpp`, `test.h` – C++ source and header files;
- `Makefile` – makefile used to compile the source code;
- `run_experiments.sh` – shell script to reproduce the experiments in the paper and generate figures from the resulting data;
- `generate_plots.scr` – gnuplot script to generate plots from the experimental results;
- `LICENSE.txt` – text file containing a copy of the license under which the artifact is released.

### 3 Getting the artifact

The artifact endorsed by the Artifact Evaluation Committee is available free of charge on the Dagstuhl Research Online Publication Server (DROPS).

### 4 Tested platforms

The provided source code was tested under the Ubuntu 20.04 and Microsoft Windows 10 operating systems on a desktop computer equipped with an Intel Core i9-9900 processor and a main memory of 32 GiB. The instructions provided in the package refer to the case of Ubuntu or similar Linux distributions. For that case, in order to compile the source code, the GNU C++ compiler (`g++` package) is required. Additionally, the GNU Make tool (`make` package) is used to support the compilation procedure. The gnuplot utility (`gnuplot` package) is used to generate the plots containing the results of the experiments.

### 5 License

The artifact is available under the MIT License.

### 6 MD5 sum of the artifact

84adbd6adb19a7638bc7fe9dd523735f

### 7 Size of the artifact

17.3 KiB