Erratum to Fixed-Relative-Deadline Scheduling of Hard Real-Time Tasks with Self-Suspensions

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In [1], we propose a fixed-relative deadline scheduling algorithm based on an equal-deadline assignment (EDA) for self-suspending sporadic (SSS) task systems. Thanks to Mr. Wen-Hung Kevin Huang from TU Dortmund, one typo was found in Theorem 3. This erratum is served to correct the typo.

- **Typo**: the exact test in Theorem 3 in [1] was

$$dbf_i^{EDA}(t) = \begin{cases} 0 & 0 \leq t < \frac{T_i - S_i}{2} \\ C_{i,\max} & \frac{T_i - S_i}{2} \leq t < T_i - S_i \\ C_{i,1} + C_{i,2} & t = T_i - S_i \\ dbf_i^{EDA}(t - \left\lfloor \frac{t-(T_i-S_i)}{T_i} \right\rfloor T_i) + (\left\lfloor \frac{t-(T_i-S_i)}{T_i} \right\rfloor + 1)(C_{i,1} + C_{i,2}) & t > T_i - S_i. \end{cases}$$

  One term in the last case was not put by a mistake while the writing of the paper accidentally. To correct this, we also alert the boundary condition, and the correct test should be

$$dbf_i^{EDA}(t) = \begin{cases} 0 & t < \frac{T_i - S_i}{2} \\ C_{i,\max} & \frac{T_i - S_i}{2} \leq t < T_i - S_i \\ C_{i,1} + C_{i,2} & t = T_i - S_i \\ dbf_i^{EDA}\left(t - (\left\lfloor \frac{t-(T_i-S_i)}{T_i} \right\rfloor + 1) \cdot T_i\right) + (\left\lfloor \frac{t-(T_i-S_i)}{T_i} \right\rfloor + 1)(C_{i,1} + C_{i,2}) & t > T_i - S_i \end{cases}$$

  This typo does not affect the rest of the paper. When we applied the arithmetics and demonstrated by using figures, we already used the correct definition of $dbf_i^{EDA}(t)$ in all the other steps for performing the linear approximation and the analyses. Therefore, the correctness of the speedup factors remains.

- **Simplification**: While preparing this erratum, we also noticed that the last case in the exact test in Theorem 3 in [1] can be simplified as

$$dbf_i^{EDA}(t) = \begin{cases} 0 & 0 \leq t < \frac{T_i - S_i}{2} \\ C_{i,\max} & \frac{T_i - S_i}{2} \leq t < T_i - S_i \\ C_{i,1} + C_{i,2} & t = T_i - S_i \\ dbf_i^{EDA}\left(t - \left\lfloor \frac{t}{T_i} \right\rfloor T_i\right) + \left\lfloor \frac{t}{T_i} \right\rfloor (C_{i,1} + C_{i,2}) & t > T_i - S_i \end{cases}$$

References

[1] J. Chen and C. Liu. Fixed-relative-deadline scheduling of hard real-time tasks with self-suspensions. In *Proceedings of the IEEE 35th IEEE Real-Time Systems Symposium, RTSS 2014, Rome, Italy, December 2-5, 2014*, pages 149–160. IEEE, 2014.