A Standard Notation for Real-Time Scheduling

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Introduction

- Last 20 years has seen significant growth in the number of people active in the Real-Time Scheduling community and the number of publications

- Today more than ever, it is important we make our research as easy as possible for others to understand and build upon

- All experienced difficulty and frustration trying to decipher unfamiliar, arbitrary and cryptic notation [1]

Proceedings: http://www.cs.unc.edu/~baruah/AlanFest/Procs.pdf

[1] It would be unfair to pick out any one paper for criticism but I see you checked hoping it wasn't yours!

Pirate Notation

- A cruel and unusual punishment for reviewers

$$C_r - RA_r - r_r = \underset{\forall l>r}{sum}(r_l.ceil(C_r, \Re_l))$$

- C_r Completion time of task r relative to its release time
- RA_r time for which task r is delayed due to Resource Accesses
- r_r is the runtime of task r
- $\Re_l$ is the Release interval of task l

A Standard Notation

- All experienced the pleasure of reading interesting, insightful, well-structured papers with clear step-by-step analysis, that uses precise terminology, and a concise, consistent and well thought-out notation [8]

[8] It would be unfair to pick out any one paper for praise but I see you checked this time hoping it was yours!

- Alan contributed greatly
  - through the volume and quality of his published research (450+ publications)
  - Number of people reading his work (~15,000 citations)
  - Number of PhD students he's supervised and nurtured into independent researchers
- Shaped a de-facto standard terminology and notation adopted by many in the real-time community

A Standard Notation

- In honour of Alan's 0x3C birthday and his enduring contribution to real-time systems research, we hope that this de-facto standard notation will from now on be referred to as:

Burns Standard Notation

and its use become so widespread that in a few years it will be hard to find a new paper on real-time scheduling that does not use it

Burns Standard Notation

- An easy notation to use, understand and extend

$$R_i = B_i + C_i + \sum_{k \in hp(i)} \left\lceil \frac{R_i}{T_k} \right\rceil C_k$$

- R_i Response time of task τ_i
- B_i Blocking time for task τ_i
- C_i Computation time of task τ_i
- T_k minimum inter-arrival time of task τ_k
- $hp(i)$ set of tasks with priorities higher than that of task τ_i

Burns Standard Notation

- **Guidelines** for using and extending Burns Standard Notation appear in the paper, along with the most commonly used examples

Please do use
Burns Standard Notation

Don't use
Pirate Notation

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