Memory-aware Response Time Analysis for P-FRP Tasks

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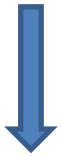
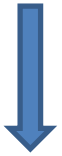
What is P-FRP?

Functional Programming



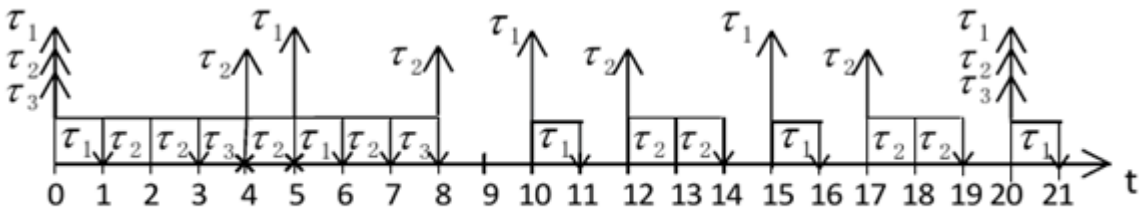
Functional Reactive Programming



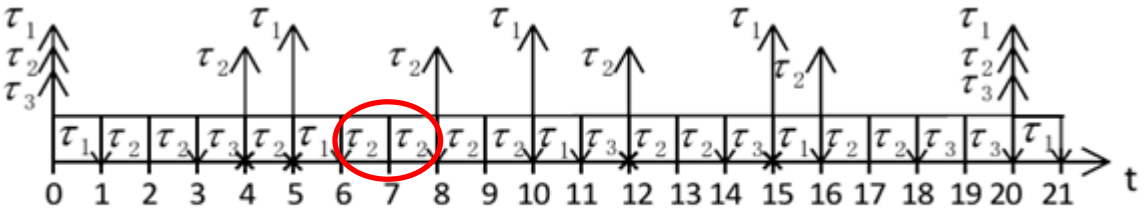
Priority-based FRP

P-FRP: AR

Task	Execution Time	Period	Priority
τ_1	1	5	1
τ_2	2	4	2
τ_3	2	20	3



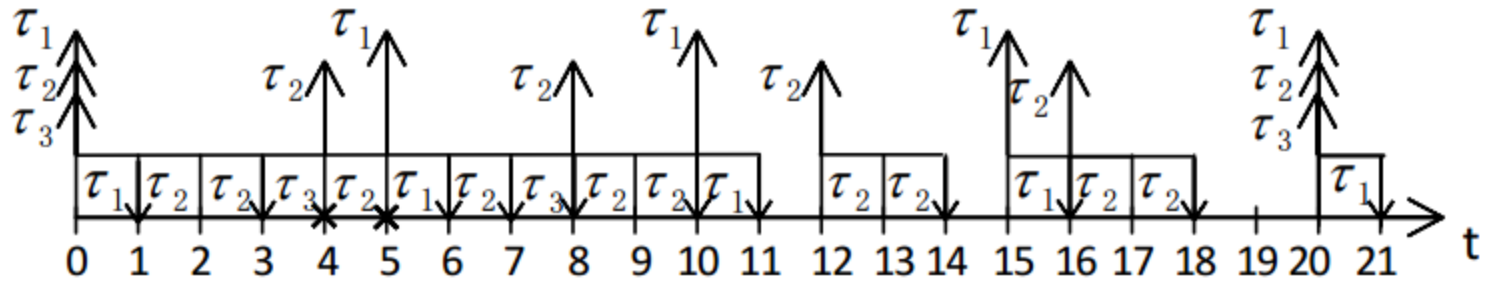
Classic Model



P-FRP Model

A New Model: Memory-aware Scheduling

Memory-aware Scheduling Model Taking into consideration that the resumed job is able to use the code/data previously stored in the system, and hence has shorter execution time than that of *cold* started job.



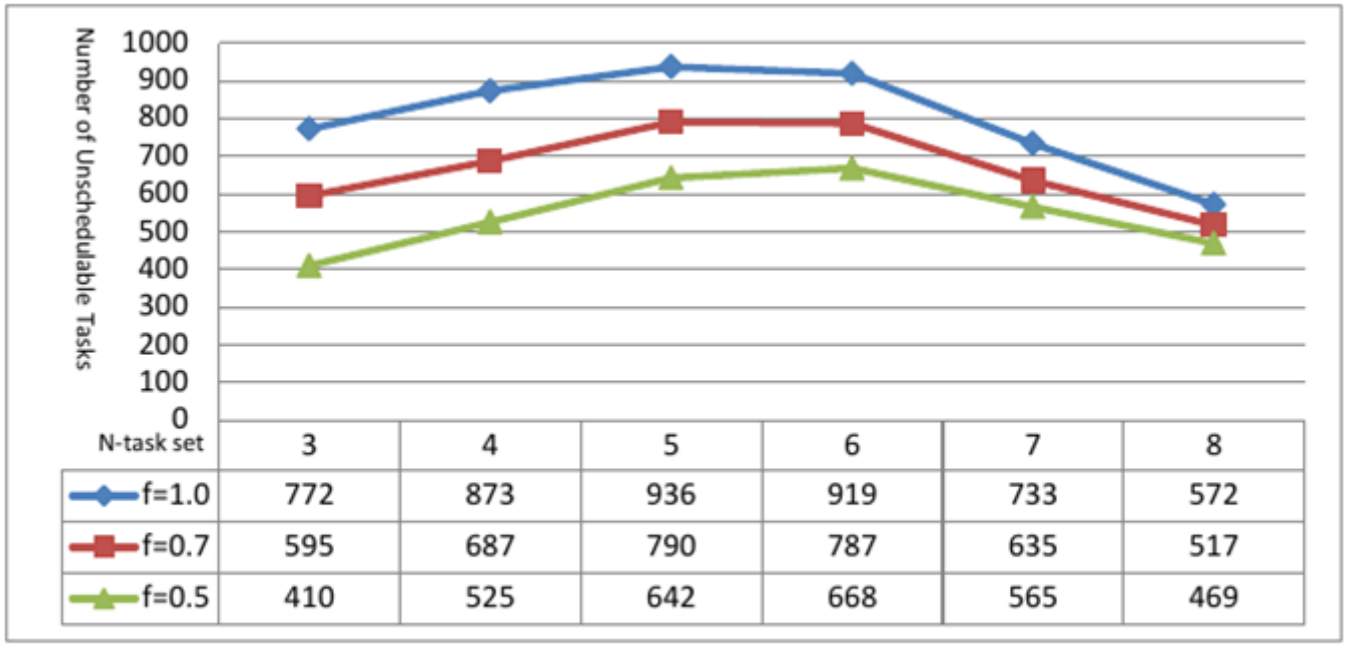
Memory-aware P-FRP scheduling of fixed priority task set ($C_1^1 = 1, C_1^2 = 1; C_2^1 = 2, C_2^2 = 1; C_3^1 = 2, C_3^2 = 1; T_1 = 5, T_2 = 4, T_3 = 20$)

Experiments and Results

Memory-aware scheduling leads to fewer unschedulable task sets than that of the original P-FRP scheduling:

(1) 22.9%, 21.3%, 15.6%, 14.4%, 13.4% and 9.6% when f = 0.7, or

(2) 46.9%, 39.9%, 31.4%, 27.3%, 22.9% and 18.0% when f = 0.5.



N-task set	3	4	5	6	7	8
f=1.0	772	873	936	919	733	572
f=0.7	595	687	790	787	635	517
f=0.5	410	525	642	668	565	469

Number of Unschedulable Task Sets

Conclusion

We propose to consider more accurate, more practical task model in P-FRP task scheduling.

Thank you!

Welcome to watch our poster.