

PyPinT

Towards a framework for rapid prototyping of iterative parallel-in-time algorithms

May 28, 2014 | Dieter Moser, Torbjörn Klatt, Dr. Robert Speck <{d.moser,t.klatt,r.speck}@fz-juelich.de> | 3rd Workshop on Parallel-in-Time Integration Methods

Overview

- 1 Recap of existing Parallel-in-Time Algorithms
- 2 The *PyPinT* Framework Explained
- 3 Goals
- 4 Proof of Concept — Examples Analyzed



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Part I: Existing Parallel-in-Time Approaches

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Parareal

RIDC

PFASST



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Part II: The PyPinT Framework Explained

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Basic Concept

- *Python* as language of choice
 - for ease of use and extensibility (cf. *NumPy*, *SciPy*)
- well-conceived and intuitive abstract interfaces
 - for reusable code ensuring DRY principle
- modular building blocks
 - for fast exchange of algorithms' building blocks
- integrated analyzation tools
 - for introspection and plotting (cf. *matplotlib*)
- usage of a sophisticated testing framework
 - nobody writes bug-free code



Modules

- pypint.communicators
- pypint.integrators
- pypint.multi_level_providers
- pypint.plugins
- pypint.problems
- pypint.solvers
 - ~.cores, ~.states
- pypint.solutions



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Part III: Goals for PyPinT

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Part IV: Proof of Concept

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Thank you for your attention!

Questions?

(now or later)

PyPinT is on  GitHub: <https://github.com/Parallel-in-Time/PyPinT>

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