



## Real Time Computing with the Parareal Algorithm

By Harden, Christopher

Condition: New. Publisher/Verlag: VDM Verlag Dr. Müller | Solving time-dependent differential equations with increased speed | This work presents and evaluates a particular algorithm used for the real time computations of time dependent ordinary and partial differential equations which employs a parallelization strategy over the temporal domain. We also discuss the coupling of this method with another popular technique used for real time computations, model reduction, which will be shown to provide more gains than either method alone. In particular, we look at reduced order modeling based on proper orthogonal decompositions. We present some applications in terms of solving time dependent nonlinear partial differential equations and solving these equations with a coupled approach of combining model reduction and the parareal algorithm. The performance of this method, both numerically and computationally, is discussed in terms of the gains in speedup and efficiency, and in terms of the scalability of the parallelization of the temporal domain on a larger and larger set of compute nodes or processors. | Format: Paperback | Language/Sprache: english | 92 pp.



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