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Recent Developments in Nek5000/RS

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We describe recent developments in the high-order open-source simulation package Nek5000/RS, which is designed to solve turbulent thermal-fluids applications on platforms ranging from laptops to exascale computers. We begin with strong-scaling design considerations and discuss scaling on pre-exascale platforms such as ORNL's V100-based Summit and ANL's A100-based Polaris platforms and on the ORNL's exascale platform, Frontier, which has 72,000+ AMD MI250X GCDs. We discuss new features for Nek5000/RS, including the reduced-order modeling package, NekROM, developed by Kento Kaneko (MIT) and Ping-Hsuan Tsai (V.Tech) and MHD support in NekRS, which is being developed by ANL summer student, Yichen Guo (V.Tech). Several examples are presented for each.

Relevance for Nek [100 words max]

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