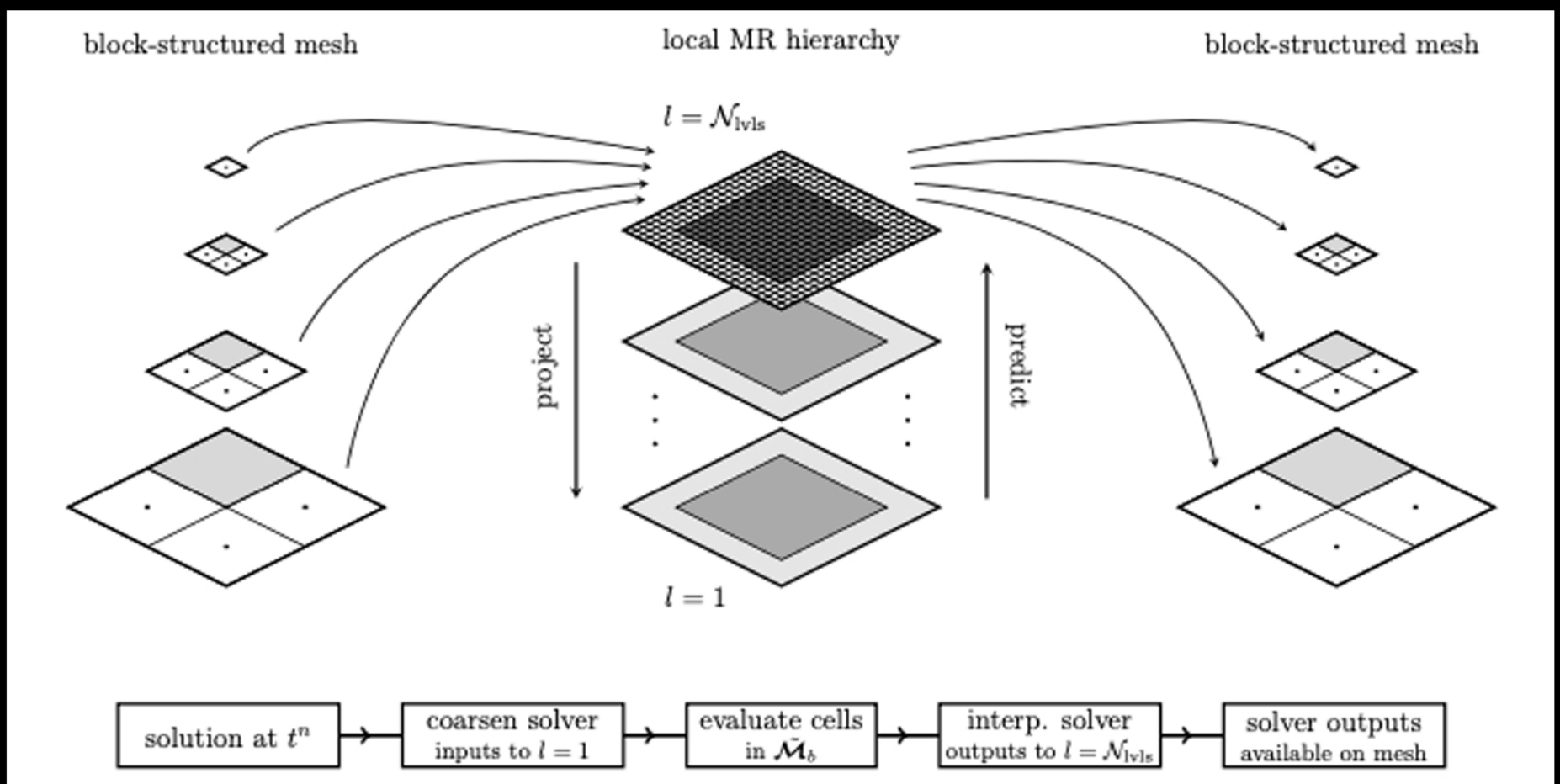
A hybrid adaptive multiresolution approach for reactive flows



Computational studies that use block-structured adaptive mesh refinement (AMR) approaches frequently suffer from unnecessarily high mesh resolution in regions immediately adjacent to important solution features. This deficiency may be a major factor limiting the performance of AMR codes. In this work a novel approach to AMR-based calculations is introduced that addresses this issue with a hybrid adaptive multiresolution (HAMR) based approach. The MR smoothness indicators are used not only to adapt the mesh, but also to decrease the computational cost of individual physics solvers in regions identified as smooth by replacing direct calculations with MR interpolation according to prespecified accuracy constraints. The accuracy of this procedure is shown to be consistent with that of the MR-driven AMR. The performance of the HAMR scheme is demonstrated for a range of test problems, from pure hydrodynamics to thermonuclear combustion.

Virtual Colloquium

3:30 to 4:30 p.m. Eastern Time (U.S. and Canada)
Wednesday, October 21, 2020

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