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Adaptive Space-Time Methods for Differential Equations

Realistic (and interesting) mathematical models often involve quantities which vary over disparate time and space scales. Successful simulation necessarily involves a blend of computational techniques and close attention to the details of the interaction between them. In this talk I review two such instances: the solution of boundary layer (or interior layer) problems utilizing fast linear algebra update strategies and recent advances in the development of a 2D Schwarz waveform relaxation moving mesh method.