Title: Nonlinearly Partitioned Runge–Kutta Integrators

Abstract: In this talk I will introduce a new class of Runge–Kutta methods, named nonlinearly partitioned Runge–Kutta (NPRK) methods. These integrators generalize additive and component partitioned Runge–Kutta methods and allow one to distribute different types of implicitness within nonlinear terms. I will motivate the framework, discuss order conditions and linear stability, and present implicit–explicit and implicit–implicit NPRK methods. Lastly, I will also present several numerical experiments that showcase the performance of NPRK methods.