

New low-storage SSP Runge-Kutta methods

Teo Roldan (Public University of Navarra), Inmaculada Higuera

Low-storage implementations are highly recommended for the numerical resolution of differential problems where memory management considerations are as important as accuracy and stability considerations. These differential problems usually are obtained after a spatial discretization of some partial differential equations.

For Runge-Kutta schemes, most of the classic low-storage methods are based on the ideas of Williamson and van der Houwen. However, some other approaches, based on Shu-Osher representations of Runge-Kutta methods, have also been considered in the literature. In some cases, optimal Strong Stability Preserving (SSP) methods have sparse Shu Osher matrices and this sparse structure can be exploited to reduce the number of registers required for its implementation.

In this talk we show new low-storage SSP Runge-Kutta methods that can be implemented in two memory registers. Although their SSP coefficients are not optimal, they have some other additional relevant properties. Some numerical experiments show the efficiency of these new schemes.