

Dynamical low-rank approximation for radiation transport

Franck MARTIN

Department of Mathematics Karlsruhe Institute of Technology

Abstract : The dynamical low-rank approximation is a low-rank factorization updating technique. It leads to differential equations for factors in a decomposition of the solution, which need to be solved numerically. The dynamical low-rank method seems particularly suitable for solving kinetic equations, because in many relevant cases the effective dynamics takes place on a lower-dimensional manifold and thus the solution has low rank. In this way, the 5-dimensional (3 space, 2 angle) radiation transport problem is reduced, both in computational cost as well as in memory footprint. We show several numerical examples.