Parabolic PDEs solved by ROCK methods

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ROCK methods (Runge-Kutta-Orthogonal-Chebyshev methods) are a new class of Chebyshev methods which combines and generalize (to higher order) the Chebyshev methods of Van der Houwen & Sommeijer and those of Lebedev. They are intended for large mildly stiff problems, originating mainly from parabolic PDEs. These methods, based on the three-term recurrence relation of a family of orthogonal polynomials, are explicit and possess extended stability domains along the negative real axis. We present here these new methods and give examples of their efficiency.