„Implicit-explicit general linear methods for ordinary differential equations"

For many systems of differential equations modeling problems in science and engineering, there are often natural splittings of the right hand side into two parts, one of which is non-stiff or mildly stiff, and the other part is stiff. For such systems we will develop a new class of implicit-explicit (IMEX) general linear methods (GLMs), where the stiff part is integrated by an implicit formula, and the non-stiff part is integrated by an explicit formula. We analyze convergence and stability of these methods when the implicit and explicit parts interact with each other. We will describe search for methods with large regions of absolute stability, assuming that the implicit part of the method is A- or L-stable. Finally we furnish examples of IMEX GLMs with optimal stability properties.

This is a joint work with A. Cardone from University of Salerno, and A. Sandu and H. Zhang from Virginia Polytechnic Institute & State University.