

Validated numerics for convolutions in the Borel plane

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Abstract

I will discuss computer assisted arguments for constructive proof of solutions to certain fixed point problems in the Borel plane. The Laplace transform of the constructed solution can solve a degenerate ordinary differential equation, or represent a parabolic center manifold for an equilibrium solution. A standard feature of such problems is the appearance of complex convolution in the nonlinear terms. This operation is nonlocal, and requires special care. Another feature of these arguments is that solutions must be continued along a ray to infinity, where the Laplace transform will be applied. This continuation argument combines pen-and-paper arguments with earlier computer assisted steps. This talk will illustrate the procedure for several examples, and is joint work with Juan Miranda.