Nonlinear Problems with Exponential Nonlinearities

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Elliptic and parabolic scalar equations involving exponential nonlinearity are studied. Results concerning multiplicity of solutions as functions of a nonlinear eigenvalue in the steady case, the same as estimations for blow-up time for the unsteady case are given. Numerical trials in the unitary ball are presented.

Then the so called *solid combustion model*, which is a system of two species coupled by a reaction that depends on a polynomial of the first species multiplied by the exponential term of the second one, both elliptic and parabolic are also studied. The difficulty in this system is not only the type of nonlinearity of the reaction, but also the boundary conditions. Notice that when the first species is constant, the problem reduces to the scalar case previously studied.

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