# Integral set contraction method and applications

Efim A Galperin
galperin.efim@uqam.ca
Universite du Quebec a Montreal, Canada

A new iterative method for solution and control of nonlinear ODE, PDE and IDE systems is developed. The method employs nondegenerate measures and a specific set-contraction operator to provide for a monotonic global descent onto the set of all solutions if they exist. If no solution exists (overdetermined systems), a measure of inconsistency of the problem is obtained. The method is always well conditioned. It can be used with a system of approximating elements. The method is illustrated in application to multiquadric representation of a PDE problem. An example is considered of the solution of a heat control problem in comparison with the solution by the quasi-reversibility method. The notion of eta-equivalence is introduced and applied to the situations exhibited in the well known examples of J. Hadamard, E.T. Copson and P.R. Garabedian.