

**Meeting:** 1003, Atlanta, Georgia, SS 31A, AMS-SIAM Special Session on Integrable Systems and Special Functions, I

1003-35-475      **Vladimir V Varlamov\*** (varlamov@panam.edu), Department of Mathematics, University of Texas - Pan American, Edinburg, TX 78541-2999. *Special Functions and Semilinear Equations in Circular Domains.*

We are concerned with the issue of smoothness of solutions of dissipative semilinear evolution equations in circular domains. A nonhomogeneous semilinear heat equation is considered as an example and an initial-boundary value problem for it is posed in a disc. Global-in-time solvability is investigated and the solution is constructed in the form of an expansion into the eigenfunctions of the Laplace operator in a disc. The solution is represented as a sum of two items, the first one corresponding to the linear problem and the second one being the "nonlinear adjustment". The issue of regularity is investigated in Sobolev spaces. It is established that the smoothness is determined by the linear item while the nonlinear adjustment is smoother than the linear part. The mechanism of smoothness transfer is revealed through the use of convolutions of Raleigh functions. A similar mechanism is revealed for some other dissipative equations in circular domains. Examples are given. (Received September 15, 2004)