1014-35-851   **Vladimir V Varlamov*** (`varlamov@utpa.edu`), Department of Mathematics, University of Texas
– Pan American, 1201 W. University Dr., Edinburg, TX 78541-2999. *Nonlinear dynamics for
semi-linear equations in circular domains and anisotropic Sobolev spaces.* Preliminary report.

Global-in-time solutions of semi-linear evolution equations in circular domains can be constructed by the method of
eigenfunction expansions. New special functions, convolutions of Rayleigh functions with respect to the Bessel index,
appear in the process. They are responsible for the nonlinear smoothing effect. It is argued that the appropriate spaces
for constructing solutions are anisotropic Sobolev spaces, i.e., Sobolev spaces weighted by the tangential derivatives. In
these spaces additional smoothness can be established due to the effect of nonlinear smoothing. Several examples of
equations are given including the Cahn-Hilliard and the Boussinesq equations. (Received September 25, 2005)