SAJID ALI, SEECS, National University of Sciences and Technology, Islamabad, Pakistan
Symmetry Analysis and Exact Solutions of Semilinear Heat Flow in Multi-Dimensions

A symmetry group method is used to obtain exact solutions for a semilinear radial heat equation in $n > 1$ dimensions with a general power nonlinearity. The method involves an ansatz technique to solve an equivalent first-order PDE system of similarity variables given by group foliations of this heat equation, using its admitted group of scaling symmetries. This yields explicit similarity solutions as well as other explicit solutions of a more general (non-similarity) form. These solutions have interesting analytical behavior connected with blow up and dispersion. In contrast, standard similarity reduction of this heat equation gives a semilinear ODE that cannot be explicitly solved by familiar integration technique such as point symmetry reduction or integration factors. This is a joint work with Prof SC Anco and Prof T Wolf.