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Adam L Prinkey* (aprinkey2009@my.fit.edu), 3620 Misty Oak Drive, Melbourne, FL 32901, and **Ugur G Abdulla** (abdulla@fit.edu). *Analysis of Interfaces of the Double Degenerate Nonlinear Reaction-Diffusion Equation.*

We consider the problem of interface development and local behavior of solutions near the interface in the following Cauchy problem for the double degenerate PDE with reaction:

$$u_t = ((u^m)_x |(u^m)_x|^{p-1})_x - bu^\beta, \quad x \in \mathbb{R}, \quad t > 0; \quad u(x, 0) = C(-x)_+^\alpha$$

The problem arises in analyzing turbulent filtration through a porous media. The interface behavior is determined by the competition between the diffusion and the reaction terms. The full solution of this problem for the reaction-diffusion equation ($p = 1$) was given in 2000 [Abdulla and King, SIAM J. Math. Anal., 32, 2(2000), 235-260] and 2002 [Abdulla, Nonlinear Analysis, 50, 4(2002), 541-560]. Our aim is to apply the methods of these papers to give a full classification for double degenerate reaction-diffusion equations with ($p > 1, mp > 1$). First we apply a nonlinear scaling method to identify which term dominates in the various regions of the (α, β) -parameter space. We then construct super/subsolutions and apply special comparison theorems in irregular domains to prove explicit formulae for the interface and local solution, with precise estimations up to constant coefficients. (Received September 15, 2015)