

1145-35-322

**amna Ali S. Abu Weden\*** (aabuweden2014@my.fit.edu) and **ugur Abdulla**. *Interface Development for the Nonlinear Degenerate Multidimensional Parabolic Equations Modeling Reaction-Diffusion Processes*.

We present a full classification of the short-time behavior of the interface in the Cauchy problem for the nonlinear second order degenerate parabolic PDE

$$u_t - \Delta u^m + bu^\beta = 0, \quad x \in \mathbb{R}, t > 0$$

with nonnegative and radially symmetric initial function  $u_0$  such that

$$\text{supp } u_0 \subset \{|x| < R\}, \quad u_0 \sim C(R - |x|)^\alpha, \quad \text{as } |x| \rightarrow R - 0,$$

where  $m > 1, C, \alpha, \beta > 0, b \in \mathbb{R}$ . Interface surface  $t = \eta(x)$  may shrink, expand or remain stationary depending on the relative strength of the diffusion and reaction terms near the boundary of support, expressed in terms of the parameters  $m, \beta, \alpha$ , sign  $b$  and  $C$ . In all cases we prove explicit formula for the interface asymptotics, and local solution near the interface. (Received August 31, 2018)