1145-35-217 **Ugur G. Abdulla** and **Lamees K. Alzaki*** (lalzaki2013@my.fit.edu). *Analysis of Interfaces for the Nonlinear Degenerate Diffusion Equation with Convection.*

We present full classification of the short-time behavior of interfaces and local structure of solutions near the interfaces in the Cauchy problem with compactly supported initial function for the nonlinear degenerate second order parabolic PDE

$$u_t = (u^m)_{xx} + b(u^\gamma)_x,\ m > 1, \gamma > 0, b \in \mathbb{R}$$

modeling diffusion-convection processes arising in fluid or gas flow in a porous media, plasma physics, population dynamics in mathematical biology and other applications. Due to the property of the finite speed of propagation the problem develops interfaces or free boundaries separating the region where solution is positive from the region where it vanishes. The interface may expand, shrink, or remain stationary as a result of the competition of the diffusion and convection forces near the interface, expressed in terms of the parameters $m, \gamma, sign\ b$, asymptotics of the initial function near its support, and whether interface is the right or left boundary curve. In all cases, we prove the explicit formula for the interface and the local solution with accuracy up to constant coefficients. The methods of the proof are based on nonlinear scaling laws, and a barrier technique using special comparison theorems in irregular domains with characteristic boundary curves. (Received August 20, 2018)