1100-65-12 **Lisha Wang*** (wanglisha1986@hotmail.com), No.2, Wenhua West Road, Weihai, Shandong 264209, Peoples Rep of China, **Xiaohua Ding** (mathdxh@126.com), No.2, Wenhua West Road, Weihai, Shandong 264209, Peoples Rep of China, and **Lih-ing Wu Roeger** (lih-ing.roeger@ttu.edu), Lubbock, TX 79409-1042. *New nonstandard finite difference schemes for a class of nonlinear advection-diffusion-reaction equations.* Preliminary report.

In this paper, our main purpose is to derive, using the subequation method, some new nonstandard finite difference (NSFD) schemes for a class of advection-diffusion-reaction equations having constant coefficients. An exact finite difference scheme is firstly constructed for a special class of nonlinear PDEs (partial differential equations) with a higher order polynomial reaction term. A detailed discussion of the mathematical structure of the exact finite difference equation is also given. Then the same analysis is extended to the cases of two- and s-dimensional nonlinear PDEs without diffusion, respectively. Secondly, some new NSFD schemes who have nonlinear denominator functions of the step sizes and nonlocal approximation of nonlinear terms in the reaction terms, are presented for the one- and two-dimensional models, respectively. Thirdly, under certain conditions on the parameters of the models and the right combination of spatial and temporal step sizes, the NSFD schemes are capable to preserve the non-negativity or the boundedness of the solutions of the models if the initial values are non-negative or bounded. Finally, some classical simulations from the literature are provided to verify the validity of our analytical results. (Received November 19, 2013)