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Joel R. Moitsheki* (moitshekij@uniwest.ac.za), Department of Mathematical Sciences, North West University Mafikeng Campus, Mmabatho, Republic of South Africa. *Systematic construction of hidden nonlocal symmetries for the inhomogeneous nonlinear diffusion equation.*

We consider a class of inhomogeneous nonlinear diffusion equations (INDE) that arise in solute transport theory. Hidden nonlocal symmetries that seem not to be recorded in the literature are systematically determined by considering an integrated equation, obtained using the general integral variable, rather than a system of first-order partial differential equations (PDEs) associated with the concentration and flux of a conservation law. Reductions for the INDE to ordinary differential equations (ODEs) are performed and some invariant solutions are constructed. (Received February 23, 2005)