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Nonlinear equations of the diffusion type describe unconfined flows in groundwater flow modeling. In case of the horizontal infiltration Dupuit assumption that the equipotential lines are vertical is often used. It makes the velocity of flow horizontal. Depending on the specific application the form of the diffusivity, that depends on the water head, can differ. For certain classes of initial and boundary conditions similarity variables can be introduced and the initial-boundary value problem for nonlinear PDE can be reduced to a boundary value problem for an ODE. In this work we construct approximate analytical solutions that respect some properties of the original problem. (Received September 20, 2016)