Symmetries and Similarity Reductions of Nonlinear Diffusion Equation

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Abstract: The inverse recursion operator, three new sets of symmetries, and infinite-dimensional Lie algebras for the nonlinear diffusion equation are given. Some nonlocal symmetries related to eigenvectors of the recursion operator Φ with the eigenvalue λ_i are also obtained with the help of the recursion operator $\Phi_i = \Phi - \lambda_i$. Using a part of these symmetries we get twelve types of nontrivial new similarity reduction.

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