

Anomalous Dimension in the Solution of the Modified Porous Medium Equation

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Abstract: A new method — perturbative summation to infinite order is presented to obtain the anomalous dimension in the solution of the modified porous medium equation. The result is the same as that in the renormalization group (RG) approach. It gives us an insight into the anomalous exponent in the asymptotic solution of the modified porous medium equation in the RG approach. Based on this discussion, we can see that the anomalous dimension appears naturally in the problem and the nonlinearity reflects the anomalous long-time behavior of the system.

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Key words: renormalization group, asymptotic analysis, nonlinear diffusion equation

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