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Critical exponents of directed percolation universal class: Three-loop approximation

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Directed bond percolation problem is an important model in statistical physics. It provides a paramount example of non-equilibrium phase transitions. Up to now its universal properties are known only to the second-order of the perturbation theory. Here, our aim is to put forward a numerical technique with critical exponents of directed percolation universality class can be calculated to the higher orders of perturbation theory. It is based on the perturbative renormalization scheme in ε , where $\varepsilon = 4 - d$ is a deviation from the upper critical dimension. Within this procedure anomalous dimensions are evaluated in two different subtraction scheme: Minimal subtraction scheme and null-momentum scheme. Numerical evaluation of integrals has been done using Vegas algorithm from CUBA library. The final results are compared with analytic calculation in two-loop approximation and Monte Carlo simulations.

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