## International Conference "Mathematical Modeling and Computational Physics, 2017" (MMCP2017)



Contribution ID: 153

Type: not specified

## The Numerical Evaluation of Universal Quantities of Directed Bond Percolation: Three-loop Approximation

Monday, 3 July 2017 16:00 (15 minutes)

Universal quantities (anomalous dimensions and critical exponents) of directed bond percolation are calculated by the renormalization group method in higher order perturbation theory. We put forward a renormalization procedure for a numerical calculation in which the quantities are expressed in terms of irreducible renormalized Feynman diagrams. The procedure is based on the perturbative renormalization scheme in formally small parameter  $\epsilon$ , where  $\epsilon = 4 - d$  denotes a deviation from an upper critical dimension. Numerical calculation of integrals has been performed using Vegas algorithm from CUBA library. Main results of our approach is a calculation of the dynamical exponent z and the critical exponent  $\eta$  to the third order in  $\epsilon$ expansion.

Primary author: Mr MIZISIN, Lukas (JINR Dubna, Pavol Josef Safarik University in Kosice)

**Co-authors:** Dr DANCO, Michal (JINR Dubna); Prof. HNATIC, Michal (JINR); Dr LUCIVJANSKY, Tomas (Pavol Josef Safarik University in Kosice)

Presenter: Mr MIZISIN, Lukas (JINR Dubna, Pavol Josef Safarik University in Kosice)

Session Classification: Mathematical methods for complex systems