Lattice fluid equation of state applicable to critical region

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We have proposed a mean field equation of state based on lattice fluid applicable to subcritical and supercritical region. The Guggenheim−Huggins−Miller equation, athermal contribution of the EOS, was modified to include the effect of density localization at near critical region, correct the conditional probability for hole−monomer pairs at high density limit and satisfy ideal gas limit. We found that physical parameter of EOS has peak function of reduced temperature except volume parameter and six parameters are necessary to calculate phase equilibrium properties. The proposed model was tested for 76 component and showed good agreement with experimental data.