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Analytical fit of distribution function of neutrino in the supernova outer part

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An analytical approximation of the local non-equilibrium distribution function of neutrinos which propagate spherically symmetric in the core-collapse supernova is obtained. In general, the fitting formula depends on four parameters but it can be simplified when the outer part of supernova is considered only. In this part, two fitting parameters are practically independent on the distance from the supernova center while the other one parameter is determined by the supernova luminosity. The check of this approximation is based on the data on the one-dimensional simulations of the neutrino propagation, being self-consistent with the supernova explosion hydrodynamics (Prometheus-Vertex code).

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