Yilmaz N. N.,
Kozub P. A.,
Revyakina M. G.,
Kozub S. N.,
Revyakin G. V.,
Ulyanov N. V.,
Lukianova V. A.,
Norik L. O.,
Cherneva V. E.

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A semi-empirical universal model describing the temperature dependence of heat capacity is developed using the Laplace distribution as a physical basis and its log-logistic analogue as an analytical form. The proposed formulation unifies the classical Debye, Einstein, and Tarasov approaches and provides an accurate representation of experimental data for solids, liquids, and gases over the entire temperature range of their stability. The model has only two parameters: the characteristic temperature and the rate of change of state, which correlate with the Debye temperature and the structural dimensionality of the substance. Analytical expressions derived from the model allow direct calculation of enthalpy and entropy without numerical integration. The log-logistic form preserves approximation accuracy within the uncertainty of measurements while enabling analytical differentiation and integration of thermodynamic functions. The proposed system of functions offers a unified, physically consistent, and computationally efficient framework for evaluating and predicting the heat capacity and related thermodynamic properties of materials.

Keywords: heat capacity, Laplace distribution, log-logistic function, semi-empirical model, thermodynamic properties, temperature dependence.