# Variational approach to Yukawa fluids: Thermodynamics and instantaneous elastic moduli

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The variational approach based on the Bogoliubov inequality using the fluid of hard spheres as a reference system is implemented to evaluate thermodynamic properties and instantaneous elastic moduli of Yukawa fluids. In particular, we calculate the excess energy, entropy, and pressure as well as instantaneous shear, bulk, and longitudinal elastic moduli. We demonstrate that the Percus-Yevick virial entropy is appropriate for such calculations and document the remarkable accuracy of this method. Some applications are briefly discussed.