From these equations it follows that

$$\kappa = \frac{9}{5} - 15\eta_0 - \frac{9}{5}\gamma \ , \tag{13}$$

or

$$K = 307.31 - 66.63\ \gamma\ \text{MeV} \ , \tag{14}$$

with our choice of parameters. Thus the compressibility is a simple linear function of the parameter γ, assuming that the values of a_1 and T_0 are kept fixed. (In fact a_1 and T_0 are not subject to significant uncertainty). Figure 2 displays $\eta(\Omega)$ for a range of assumed values of K.

7. Neutron matter

A similar equation holds for the energy per neutron of neutron matter at density ρ_n

$$\eta(\rho_n) = \frac{3}{5}(1-\gamma_\ell)\Phi^2 - \frac{1}{2}\alpha_\ell\Phi^3 + \frac{3}{5}B_\ell\Phi^5 \ , \tag{15}$$

where $\Phi = \left(\rho_n / \tfrac{1}{2}\rho_0\right)^{1/3}$ gives the density ρ_n relative to its value for standard nuclear matter. Figure 3 displays $\eta(\Phi)$ for various choices of the ratio of like to unlike interaction strengths.

8. General nuclear matter $\left(\rho_n > \rho_p\right)$

Consider nuclear matter with a fixed ratio of N/Z, i.e., a fixed relative neutron excess $I = (N-Z)/A = (\rho_n - \rho_z)/\rho$. It turns out that the energy per particle as a function of the density can still be written in the form

$$\eta(\rho) = \frac{3}{5}(1-\bar{\gamma})\Omega^2 - \frac{1}{2}\bar{\alpha}\Omega^3 + \frac{3}{5}\bar{B}\Omega^5 \ , \tag{16}$$

where, as before, $\Omega = (\rho/\rho_0)^{1/3}$, but where the coefficients $\bar{\gamma}$, $\bar{\alpha}$, $\bar{B}$ are now given in terms of I by the following expressions:

$$1-\bar{\gamma} = \frac{1}{2}(1-\gamma_\ell)\left(p^5+q^5\right) - \frac{1}{4}\gamma_u p^2 q^3\left(5p^2q^3 - q^5\right) \tag{17}$$