

The grand potential of the order 2

$$\begin{aligned}\Omega_2 = & \\ & -\frac{1}{8}\{1,2|V|3,4\}\{3,4|V|1,2\}\left(\frac{+f_3^-f_4^-f_2^+-f_1^-f_2^-f_3^++f_1^-f_3^-f_4^- -f_1^-f_2^-f_3^-}{(-E_3-E_4+E_1+E_2)}\right) \\ & +\frac{1}{2}\{1,2|V|1,4\}\{3,4|V|3,2\}f_1^-f_3^-\left(\frac{+f_3^- -f_2^-}{(-E_4+E_2)}\right)\end{aligned}$$