$$C(t) = \Omega \sum_k J_k(\Omega t) \int_{-1}^{1} \mathrm{d}x (2 - \delta_{0,k})(-i)^k T_k(x) \frac{\mathcal{J}(\Omega x)}{1 - e^{-\beta \hbar \Omega x}}$$

$$(1)$$