

[tex81] Ideal gas partition function and density of states

- (a) Starting from the result of [tex73] for the phase-space volume $\Omega(U, V, N)$ of a classical ideal gas (N particles with mass m) in the microcanonical ensemble, calculate the density of microstates, $g_N(u)$, and then, via Laplace transform, the result of [tex76] for the canonical partition function $Z_N(\beta)$, where $\beta = 1/k_B T$.
- (b) Starting from the canonical partition function $Z_N(\beta)$ analytically continued into the complex plane, calculate the density of state $g_N(U)$ via inverse Laplace transform.

Solution: