

[tex137] Irreversible heat exchange

Consider an insulating box with two compartments. Each compartment initially contains N atoms of a monatomic classical ideal gas in equilibrium at initial temperatures $T_1 \neq T_2$ and at the same initial pressure p . Gas atoms are then allowed to leak through a hole in the dividing wall.

- (a) Find the uniform temperature T in the final equilibrium state as a function of T_1 and T_2 .
- (b) Show that the pressure remains the same in the final equilibrium state.
- (c) Find the increase in total entropy, ΔS , between the initial and final equilibrium states.

Solution: