6.1 Bose condensation in a harmonic trap(25)

Similarly to the free 3D gas, calculate the number of particles *above the condensate* at chemical potential $\mu = 0$. This can be done either in the classical approximation ($\int \frac{d^3x d^3p}{(2\pi\hbar)^3}$) or summing over quantized 3D harmonic oscillator levels (don't forget the degeneracy). The temperature is critical when $N^B(\mu = 0, T = T_c) = N$ (total number of particles).

6.2 Temperature of the Earth(25)

(a) Use the Stefan-Boltzmann law to calculate the balance of absorbed and emitted energy. Take into account *all* the emitting Earth's surface (assuming the temperature is the same everywhere).
(b) On the Moon surface, the temperature is varying. The difference from the Earth's case is that the absorbed/emitted energy balance is *local* because there is no heat transfer across surface.

6.3 Voltage fluctuation in an LC circuit(25)

Treat the LC circuit as 1-degree-of-freedom oscillator in a heatbath at some temperature T.