Physical constants:
\[ h = 1.055 \times 10^{-34} \text{ [J-s]} \quad m_0 = 9.109 \times 10^{-31} \text{ [kg]} \]
\[ k_B = 1.380 \times 10^{-23} \text{ [J/K]} \quad q = 1.602 \times 10^{-19} \text{ [C]} \]
\[ \varepsilon_0 = 8.854 \times 10^{-14} \text{ [F/cm]} \]

Density of states in k-space:
1D: \( N_k = 2 \times \left( \frac{L}{2\pi} \right) = \frac{L}{\pi} \)
2D: \( N_k = 2 \times \left( \frac{A}{4\pi^2} \right) = \frac{A}{2\pi^2} \)
3D: \( N_k = 2 \times \left( \frac{\Omega}{8\pi^3} \right) = \frac{\Omega}{4\pi^3} \)

Density of states in energy (parabolic bands, per length, area, or volume):
\[
D_{1D}(E) = g_v \frac{2m^*}{\pi \hbar} \sqrt{\frac{2m^*}{E - \varepsilon_1}} \\
D_{2D}(E) = g_v m^* \frac{1}{\pi h^2} \\
D_{3D}(E) = g_v m^* \frac{2m^* (E - E_C)}{\pi^2 h^3}
\]

Fermi function and Fermi-Dirac Integrals:
\[
f_0(E) = \frac{1}{1 + e^{(E-E_F)/\hbar k T}} \\
F_j(\eta_F) = \frac{1}{\Gamma(j+1)} \int_0^\infty \eta^j d\eta \\
F_j(\eta_F) \to e^0 \quad \eta_F << 0 \\
\frac{dF_j}{d\eta_F} = F_{j-1}
\]
\[ \Gamma(n) = (n-1)! \quad (n \text{ an integer}) \] \[ \Gamma(1/2) = \sqrt{\pi} \] \[ \Gamma(p+1) = p\Gamma(p) \]