2. (c) \[ E_k = 2t_x \cos k_x a + 2t_y \cos k_y b + 2t_z \cos k_z c. \]

(ii) Since no term contains (say) both \(k_x\) & \(k_y\), the (inverse) mass tensor is diagonal, then
\[
\frac{1}{m_x} = \frac{1}{h^2} \frac{\partial^2 E_k}{\partial k_x^2} \bigg|_{k=0} = -2t_x q_x^2 \cos k_x a_x \bigg|_{k=0} = -2 \frac{t_x q_x^2}{h^2}.
\]

So effective mass is \(m_x = \frac{1}{\frac{t_x q_x^2}{h^2}}\). Narrower bands (smaller \(t\)) have higher mass.

Also, note the "strange" minus sign. If \(t_x > 0\), then the effective mass is negative. Turns out this is OK, in fact it is right (next quarter).