$E = E_0 - \dfrac{\hbar^2 k^2}{2m_{\mathrm{p}}}$

$E = \dfrac{\hbar^2 k^2}{2m_{\mathrm{n}}}$

$v = \dfrac{1}{\hbar}\dfrac{\mathrm{d}E}{\mathrm{d}k}$

$\boldsymbol{v} = -\dfrac{\hbar}{m_{\mathrm{p}}}\boldsymbol{k}$

$\boldsymbol{v} = \dfrac{\hbar}{m_{\mathrm{n}}}\boldsymbol{k}$

$m_{\mathrm{eff}} = m_{\mathrm{n}}$

$m_{\mathrm{eff}} = \hbar^2\left(\dfrac{\mathrm{d}^2 E}{\mathrm{d}k^2}\right)^{-1}$

$m_{\mathrm{eff}} = -m_{\mathrm{p}}$