If I want to computer a formula k_F like that

$$k_F = \frac{\rho_f\left(\omega - V_x\frac{m\pi}{L}\right)^2}{k_r Z_n{}'(k_r R)} Z_n(k_r R),$$

$$Z_n(k_r R) = \begin{cases} BesselJ & k_r^2 = \left(\dfrac{\omega - V_x\dfrac{m\pi}{L}}{C_f}\right)^2 - \left(\dfrac{m\pi}{L}\right)^2 \geq 0 \\ BesselI & k_r^2 = \left(\dfrac{m\pi}{L}\right)^2 - \left(\dfrac{\omega - V_x\dfrac{m\pi}{L}}{C_f}\right)^2 > 0 \end{cases}$$

And an unknown number, others are constant.

In maple I do

$$hh := (\varpi) \rightarrow \left(\frac{\varpi - V\cdot\frac{m\cdot\pi}{LL}}{C_f}\right)^2 - \left(\frac{m\cdot\pi}{LL}\right)^2 \qquad k_r^2$$

$$H := (\varpi) \rightarrow piecewise\left(0 \leq hh(\varpi), \sqrt{hh(\varpi)}, hh(\varpi) < 0, \sqrt{-hh(\varpi)}\right); \qquad k_r$$

$$Y := (\varpi) \rightarrow piecewise\left(0 \leq hh(\varpi), \mathrm{BesselJ}\left(\mathrm{n}, R\cdot\sqrt{hh(\varpi)}\right), hh(\varpi) < 0, \mathrm{BesselI}\left(\mathrm{n}, R\cdot\sqrt{-hh(\varpi)}\right)\right); \qquad Z_n(k_r R)$$

$$YY := (\varpi, z) \rightarrow piecewise(0 \leq hh(\varpi), \mathrm{BesselJ}(\mathrm{n}, z), hh(\varpi) < 0, \mathrm{BesselI}(\mathrm{n}, z));$$

$$www := (\varpi) \rightarrow \mathrm{D}[2](YY)\left(\varpi, R\cdot\sqrt{hh(\varpi)}\right); \qquad Z_n{}'(k_r R)$$

$$PF := (\varpi) \rightarrow \frac{\rho_f\cdot\left(\varpi - V\cdot\frac{m\cdot\pi}{LL}\right)^2}{H(\varpi)\cdot www(\varpi)}\cdot Y(\varpi);$$

Is it right?

Thank you very much.