Filtro pasa altas.

$$f_s = 44100, f_c = 5000 \, Hz$$

Función de transferencia desde el voltaje de entrada al voltaje de la resistencia

$$H_R(s) = \frac{RCs}{1 + RCs}$$

Donde $RC = \frac{1}{2\pi f_c}$

Para la transformación bilineal

$$s \leftarrow \frac{2}{T}\frac{z-1}{z+1}$$

$$H_R(z) = \frac{RC(\frac{2}{T}\frac{z-1}{z+1})}{1 + RC(\frac{2}{T}\frac{z-1}{z+1})} = \frac{RC(\frac{2}{T}\frac{z-1}{z+1})}{\frac{T(z+1) + RC(2(z-1))}{T(z+1)}} = \frac{2RC(z-1)[T(z+1)]}{T(z+1)[T(z+1) + 2RC(z-1)]}$$

$$H_R(z) = \frac{2RC(z-1)}{T(z+1) + 2RC(z-1)} = \frac{2RCz - 2RC}{Tz + T + 2RCz - 2RC} = \frac{2RCz - 2RC}{(T+2RC)z + (T-2RC)} \frac{\frac{1}{T}}{\frac{1}{T}}$$

$$H_R(z) = \frac{\frac{2RCz}{T} - \frac{2RC}{T}}{\left(1 + \frac{2RC}{T}\right)z + \left(1 - \frac{2RC}{T}\right)} \left(\frac{\frac{z}{1}}{\frac{1}{z}}\right)$$

$$H_R(z) = \frac{\frac{2RC}{T} - \frac{2RC}{T}z^{-1}}{\left(1 + \frac{2RC}{T}\right) + \left(1 - \frac{2RC}{T}\right)z^{-1}} \left(\frac{\frac{1}{1 + \frac{2RC}{T}}}{\frac{1}{1 + \frac{2RC}{T}}}\right)$$

$$= \frac{\frac{2}{\frac{T}{RC} + 2} - \frac{2}{\frac{T}{RC} + 2}z^{-1}}{1 + \left(\frac{\frac{T}{RC} - 2}{\frac{T}{RC} + 2}\right)z^{-1}} = \frac{\frac{2}{\frac{1}{44100} + 2} - \frac{2}{\frac{1}{44100} + 2}z^{-1}}{1 + \left(\frac{\frac{1}{44100} - 2}{\frac{1}{2\pi \cdot 5000} + 2}\right)z^{-1}} = \frac{0.728831 - 0.728831z^{-1}}{1 - 0.457663z^{-1}}$$