PROBLEM:

For the same feed-forward filter as used in the previous problem:

$$y[n] = x[n] + \sqrt{2}x[n-1] + x[n-2]$$

(a) Find the frequency response of the system as a mathematical formula.

(b) Plot (with a hand sketch) the magnitude of the frequency response versus ω, in the range $-2\pi < \omega < 2\pi$. Label all important points: peaks, valleys, zeros, etc. Give numerical values where it is easy to estimate, e.g., at $\omega = 0, \pi, \pi/2$, etc.

(c) If applied to the rows or columns of an image, would this filter blur the image, or sharpen it? EXPLAIN.