

Solution to ECE Test #7 S05

Below are some pole-zero plots of transfer functions of systems of the general form,

$$H(s) = A \frac{(s - z_1) (s - z_N)}{(s - p_1) (s - p_D)}$$

in which $A = 1$, the z 's are the zeros and the p 's are the

poles. Answer the following questions. (The use of the term “one(s)” means there might be more than one answer. In that case provide all the correct answers.) One point per correct answer.

- Which one(s) have a magnitude frequency response that is non-zero at $\omega = 0$? A,D,E,F
- Which one(s) have a magnitude frequency response that is non-zero as $\omega \rightarrow \infty$? A,F
- There are two which have a bandpass frequency response (zero at zero and zero at infinity). Which one is more underdamped (higher Q)? C
- Which one has a magnitude frequency response whose shape is closest to being a bandstop filter? F
- Which one(s) have a magnitude frequency response that approaches K / ω^6 at very high frequencies (K is a constant)? E
- Which one has a magnitude frequency response that is constant? A
- Which one has a magnitude frequency response whose shape is closest to an ideal lowpass filter? D
- Which one(s) have a phase frequency response that is discontinuous at $\omega = 0$? B,C

