Digital Signal Processing
z-Plane Examples

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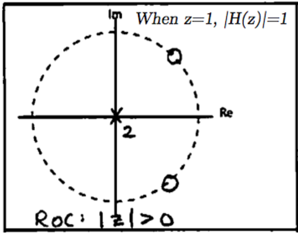
Example 1



When $z=1$, $|H(z)|=1$

ROC: $|z|>0$

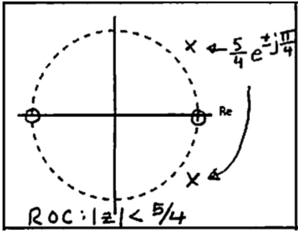
- ○ lowpass
- ○ highpass
- ○ bandpass
- ○ bandstop/notch
- ○ allpass
- ○ none of the above

- ○ FIR type 1
- ○ FIR type 2
- ○ FIR type 3
- ○ FIR type 4
- ○ FIR no type
- ○ IIR
- ○ none of the above

- ○ causal
- ○ not causal
- ○ inconclusive

- ○ stable
- ○ not stable
- ○ inconclusive

Example 2


$\times \leftarrow \frac{5}{4}e^{\pm j\frac{\pi}{4}}$
Re
ROC: $|z| < 5/4$

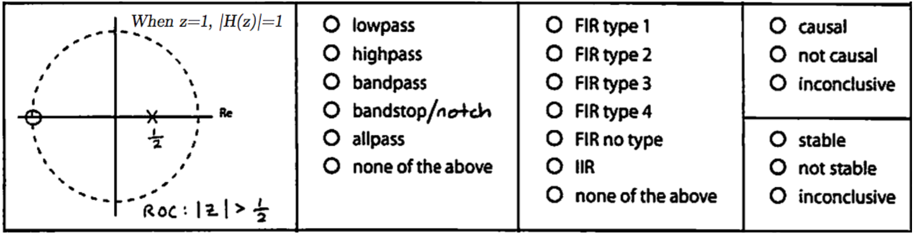
- ○ lowpass
- ○ highpass
- ○ bandpass
- ○ bandstop /notch
- ○ allpass
- ○ none of the above

- ○ FIR type 1
- ○ FIR type 2
- ○ FIR type 3
- ○ FIR type 4
- ○ FIR no type
- ○ IIR
- ○ none of the above

- ○ causal
- ○ not causal
- ○ inconclusive

- ○ stable
- ○ not stable
- ○ inconclusive

Example 3



When $z=1$, $|H(z)|=1$

Re

$\frac{1}{2}$

ROC: $|z| > \frac{1}{2}$

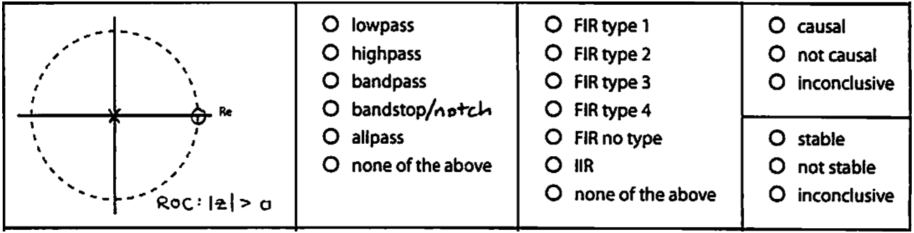
- ○ lowpass
- ○ highpass
- ○ bandpass
- ○ bandstop/notch
- ○ allpass
- ○ none of the above

- ○ FIR type 1
- ○ FIR type 2
- ○ FIR type 3
- ○ FIR type 4
- ○ FIR no type
- ○ IIR
- ○ none of the above

- ○ causal
- ○ not causal
- ○ inconclusive

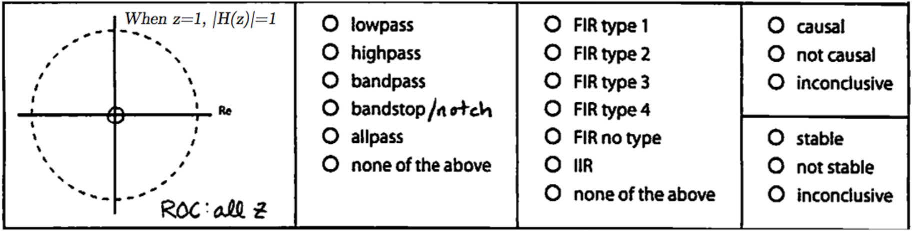
- ○ stable
- ○ not stable
- ○ inconclusive

Example 4



ROC: $\|z\| > a$	○ lowpass ○ highpass ○ bandpass ○ bandstop/notch ○ allpass ○ none of the above	○ FIR type 1 ○ FIR type 2 ○ FIR type 3 ○ FIR type 4 ○ FIR no type ○ IIR ○ none of the above	○ causal ○ not causal ○ inconclusive
			○ stable ○ not stable ○ inconclusive

Example 5



When $z=1$, $|H(z)|=1$

ROC: all z

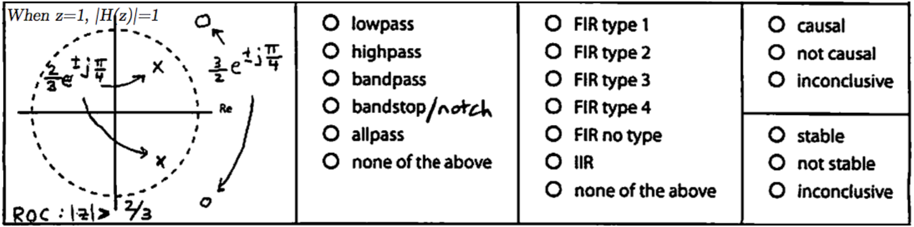
- ○ lowpass
- ○ highpass
- ○ bandpass
- ○ bandstop/notch
- ○ allpass
- ○ none of the above

- ○ FIR type 1
- ○ FIR type 2
- ○ FIR type 3
- ○ FIR type 4
- ○ FIR no type
- ○ IIR
- ○ none of the above

- ○ causal
- ○ not causal
- ○ inconclusive

- ○ stable
- ○ not stable
- ○ inconclusive

Example 6



When $z=1$, $|H(z)|=1$

$\frac{2}{3}e^{\pm j\frac{\pi}{4}}$
$\frac{3}{2}e^{\pm j\frac{\pi}{4}}$
Re

ROC : $|z| > 2/3$

○ lowpass	○ FIR type 1	○ causal
○ highpass	○ FIR type 2	○ not causal
○ bandpass	○ FIR type 3	○ inconclusive
○ bandstop/notch	○ FIR type 4	
○ allpass	○ FIR no type	○ stable
○ none of the above	○ IIR	○ not stable
	○ none of the above	○ inconclusive