KNOWLEDGE PROBE 2: DIGITAL SIGNAL PROCESSING
Digital Filters

Learning Objectives

1. Describe the process of DSP.
2. Outline the advantages and disadvantages of DSP.
3. Explain the basic techniques involved in DSP.
4. Name and explain the most common DSP processes.

1. Filtering is the most common DSP application.
   a. True
   b. False

2. Good selectivity is generally described by a response curve that has
   a. Gradual skirts
   b. Steep skirts

3. Digital filters can achieve selectivity not possible with analog filters.
   a. True
   b. False

4. A digital filter with vertical response skirts is sometimes referred to as a
   a. Brick wall filter
   b. Ideal filter
   c. Infinite response filter
   d. Perfect filter

5. A key limitation of an analog filter, when passing pulse signals, is its
   a. Excessive distortion
   b. High attenuation
   c. Phase response
   d. Poor selectivity

6. Temperature and aging also affect digital filters as they do filters made with R, L, and C.
   a. True
   b. False

7. Which of the following is NOT a type of digital filter?
   a. Active filter
   b. Averaging filter
   c. FIR filter
   d. IIR filter

8. The averaging filter is used mainly for
   a. Arithmetic operations
   b. Eliminating distortion
   c. Low pass filtering
   d. Minimizing noise

9. Which type of filter uses recursion?
   a. Active filter
   b. Averaging filter
   c. FIR filter
   d. IIR filter

10. In the mathematical expression for a digital filter, the “a“ term is a(n)
    a. Constant
    b. Input sample
    c. Output sample
    d. Variable

11. The two basic arithmetic operations performed in a DSP filter are
    a. Add-divide
    b. Add-subtract
    c. Multiply-add
    d. Multiply-subtract

12. The number of taps in a digital filter is equal to the number of
    a. Additions
    b. Coefficient multiplies
    c. Delays
    d. Sampling rate

13. An averaging filter is similar to a
    a. BPF
    b. HPF
    c. LPF
    d. Notch

14. What determines whether a filter is a low pass, high pass, band pass, or notch?
    a. Coefficient values
    b. Number of taps
    c. Sampling rate
    d. Speed of the arithmetic operations

15. What determines the selectivity of a FIR filter?
    a. Coefficient values
    b. Number of taps
    c. Sampling rate
    d. Speed of the arithmetic operations

16. All DSP processing in a FIR filter must occur during the time between the samples.
    a. True
    b. False

17. To achieve the equivalent selectivity of a FIR filter, an IIR filter will have
    a. Fewer taps
    b. More taps
    c. Same number of taps

18. IIR filters compute faster than FIR filters for equal selectivity.
    a. True
    b. False

19. Which of the following is NOT a disadvantage of an IIR filter?
    a. It can be unstable
    b. It has a non-linear phase response
    c. It is easier to design
    d. It is harder to design