

Instructional Objectives for Roberts Chapter 2 – Mathematical Description of Continuous-Time Signals

2.3 Signal Functions

Describe the properties of complex exponentials and sinusoids.

Sketch and describe properties of the following elementary functions: unit step, signum, unit ramp, unit impulse, unit comb, unit triangle, unit sinc and the Dirichlet functions.

2.4 Functions and Combinations of Functions

Write a simplified expression for the resultant function when elementary functions are combined by addition, subtraction, multiplication and/or division.

Sketch the resultant function when elementary functions are combined by addition, subtraction, multiplication and/or division.

Describe the result when the independent variable is replaced by another function.

2.5 Scaling and Shifting

Explain the following operations on dependent variables: scaling, addition, and multiplication.

Explain the following operations on independent variables: time scaling, reflection, time-shifting,

Apply the rules of precedence when time-shifting and time scaling a signal.

2.6 Differentiation and Integration

Write the expressions for the integral or derivative of a function.

Calculate the integral or the derivative of a function.

2.7 Even and Odd Functions

Determine if a function is even or odd.

Determine the even and odd parts of a composite function.

2.8 Periodic Functions

Given an expression for a sinusoid, determine the frequency and period.

Given the plot of a periodic function, determine the fundamental period.

Determine the fundamental period of a sum of periodic functions.

2.9 Signal Energy and Power

Calculate the signal energy of a continuous-time.

Calculate the average signal power of a continuous-time.

Explain the difference between an energy signal and a power signal.