

# Signal Analysis

## Lab 1: Discrete-Time Signals

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Plot the following discrete-time signals as stem plots for  $n \in \{-20, \dots, 20\}$

- 1) Impulse  $\delta[n]$
- 2) Unit Step  $u[n]$
- 3) Exponential Decay  $x[n] = a^n u[n]$  with  $a = 0.9$
- 4) Sine for  $\omega_0 = \pi/20.0$  and  $\phi = 0$
- 5) Cosine for  $\omega_0 = \pi/20.0$  and  $\phi = 0$
- 6) Complex Exponential for  $\omega_0 = \pi/20.0$  and  $\phi = 0$
- 7) Complex Exponential for  $\omega_0 = \pi/20.0$  and  $\phi = -\pi/2.0$
- 8) Complex Exponential for  $\omega_0 = \pi/10.0$  and  $\phi = 0.0$
- 9) Sine for  $\omega_0 = \pi\sqrt{2}/20.0$  and  $\phi = 0.0$
- 10) Triangular discrete-time wave  $x[n] = \text{mod}(n + 10, 21) - 10$