Lab Assignment - 02 - Spring 2020

Signal & Systems
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January 29, 2020

1 Signal Generation

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1. For the given signals

$$x(t) = \begin{matrix} 0 & t < 1 \\ t-1 & 1 \le t < 2 \\ 2 - \frac{t}{2} & 2 \le t < 4 \\ -1 & 4 \le t < 5 \\ 0 & \text{Otherwise} \end{matrix} \qquad y(t) = \begin{matrix} 0 & t < 1 \\ 1 & 1 \le t < 2 \\ -2 & 2 \le t < 4 \\ t-4 & 4 \le t < 5 \\ 0 & \text{Otherwise} \end{matrix}$$

   plot the following signal transformations: a) x(t- 1) y(t+1), b) x(2 - t)y(1-t) and c) x(2t - 4)y(t)

2. For the given signals

$$x(t) = \begin{matrix} 0 & t < 1 \\ 1-t & 1 \le t < 2 \\ -3+t & 2 \le t < 3 \\ 1 & 3 \le t < 4 \\ 0 & \text{Otherwise} \end{matrix} \qquad y(t) = \begin{matrix} 0 & t < 1 \\ 1 & 1 \le t < 2 \\ -2 & 2 \le t < 3 \\ t-5 & 3 \le t < 4 \\ 0 & \text{Otherwise} \end{matrix}$$

   plot the following signal transformations: a) x(t + 1) y(t -1), b) x(2 + t)y(-1-t) and c) x(-2t - 4)y(-t)

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3. Given the discrete signal,

$$x[n] = \{\underset{\uparrow}{2},\ -2,\ 3,\ 4,\ -4\}$$

   plot the following transformations

   - $x[n+1]$
   - $x[n-2]$

- $x[3-n]$
- $x[3-2n]$
- $x[4n+5]$

4. Given the discrete signal,

$$x[n] = \{\underset{\uparrow}{-1},\ 2,\ -3,\ -4,\ 5\}$$

plot the following transformations

- $x[n-1]$
- $x[n+2]$
- $x[-3-n]$
- $x[-3+2n]$
- $x[4n-5]$

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2 Instructions

Please get your results verified by a TA.