Foundations of Audio Signal Processing
Assignment 10

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January 11, 2019

Exercise 10.1

a.
Let $x(n) = (x(0), x(1), x(2)) = (1, 2, 3)$, $y(n) = (y(0), y(1)) = (4, 5)$. Let $z(n) = (x * y)(n)$

$$z(0) = \sum_{k \in \mathbb{Z}} x(k).y(0-k) = x(0).y(0) = 1.4 = 4$$

$$z(1) = \sum_{k \in \mathbb{Z}} x(k).y(1-k) = x(0).y(1) + x(1).y(0) = 1.5 + 2.4 = 13$$

$$z(2) = \sum_{k \in \mathbb{Z}} x(k).y(2-k) = x(1).y(1) + x(2).y(0) = 2.5 + 3.4 = 22$$

$$z(3) = \sum_{k \in \mathbb{Z}} x(k).y(3-k) = x(2).y(1) = 3.5 = 15$$

Therefore, $z(n) = (x * y)(n) = (z(0), z(1), z(2), z(3)) = (4, 13, 22, 15)$