

Arab Academy for Science and technology
College of Engineering and Technology
Electronics & Communication Dept.

Course: Communication system IV

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Sheet I

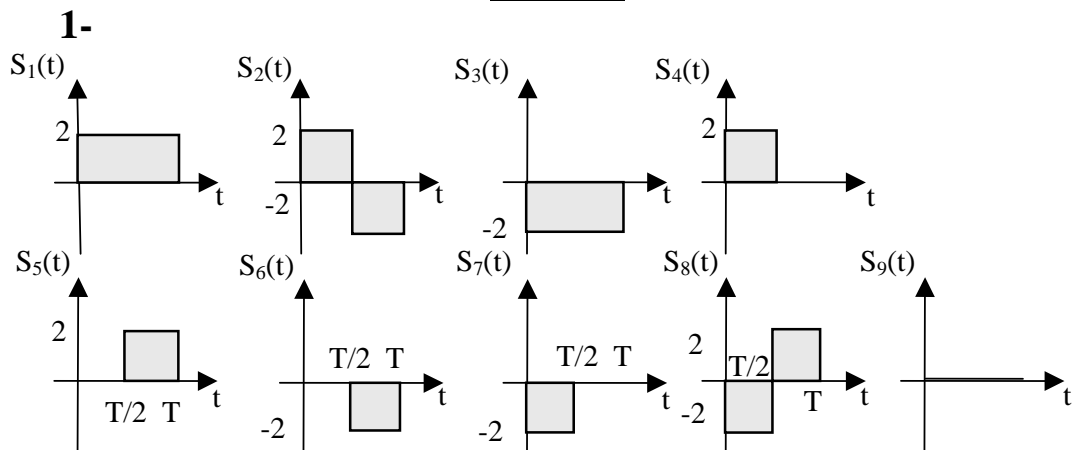


Figure (a)

For the set of signals shown in Figure(a) :

1. Apply the Gram Schmidt orthogonalization procedure and find the number of basis functions N required to represent the rest of the signals in the shown set.
2. Find the ortho-normal basis functions.
3. Sketch the ortho-normal basis functions.
4. Express the signals in terms of the basis functions.
5. Sketch to scale the signals in S.S.

2- For the same set of signals shown in Figure (a), suggest another N basis functions and repeat all the above questions in problem 1 for the new basis functions.

3-

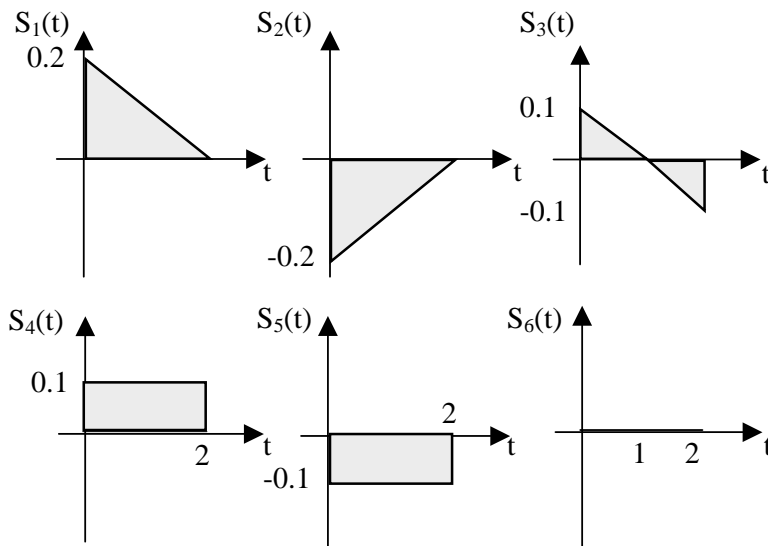


Figure (b)

For the set of signals shown in Figure(b):

1. Apply the Gram Schmidt orthogonalization procedure and find the number of basis functions N required to represent the rest of the signals in the shown set.
2. Find the ortho-normal basis functions.
3. Sketch the ortho-normal basis functions.
4. Express the signals in terms of the basis functions.
5. Sketch to scale the signals in S.S.

3- A communication system transmits one of the following signals:

$$s_i(t) = \cos\left(2\pi f_c t + i \frac{\pi}{4}\right) \quad 0 \leq t \leq T$$

$$\boxed{i=1,2,3,4 \quad f_c T=1}$$

1. Define the used basis functions.
2. Express the four signals in terms of the defined basis functions.
3. Sketch to scale the signals in S.S.