a)

Rewrite as unit step function we have:

b)

The Fourier series is given by:

a)

b)

Given that:

Let , it holds that:

Taking -transform both side of , we obtain:

Thus, the solution of the given system difference equations is:

Given that:

Let , it holds that:

Taking Laplace transform both sides of , we obtain:

Thus, the solution of the given differential equation is:

a)

Let

We have:

Thus,

b)

Given that:

Let , it holds that:

Taking Laplace transform both sides of , we obtain:

Thus, the solution of the given differential equation is:

Given that:

The half range cosine series is given by:

Where:

Thus,