a)

Since, we have:

Let: , it leads to:

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:

Let

Taking Laplace transform both sides of , we obtain:

Thus, the current with time is:

a)

The Fourier series is given by:

b)

Since we have:

Therefore,

a)

Thus,

b)

Given that:

Let:

Taking -transform both side of , we obtain:

Taking -transform both side of , we obtain:

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