a)

b)

Let where

exists at a point if and only if at this point it satisfies the Cauchy-Riemann equation:

Thus, for all points which belong to the line in the -plane lead to existence of

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:

Since, we know that:

Therefore, there is exist 3 cubic roots of as follows:

b)

Let the current flow to capacitor which depend on time is , it leads to the charge of the capacitor is given by

Applying Kirchhoff voltage law for the circuit, we obtain the first order differential equation:

The problem gives us: , is constant.

Taking Laplace transforms both sides of , we get:

Therefore,

Thus, the charge on the capacitor is:

a)

b)

a)

Since, we know that:

Therefore,

Hence,

b)

Apply power series for analyzing this problem:

Case 1:

This series hold for , according to the power series

Case 2:

This series hold for , according to the power series

Therefore,