**ASSIGNMENT 07**

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**Q7.2**

The stream line equations are:

and

Integrating:

and

the stream line equation is

The path line equations are:

and

Integrating,

and

Let the particles pass through at time .

and

Hence the equation of the streakline is .

**Q 7.3**

The given hyperbolic partial differential equation is: , in the domain using the Dirichlet boundary condition in . The initial values are the position and the velocity .

1. Let .

Let

the given PDE can be decomposed into two ODEs of second order:

and

1. The boundary and initial conditions after the separation of variables can be written as:

**Case I:**

The characteristic equation will be

The solution is of the form , where and are constants.

Putting the boundary conditions,

either or , which is not possible since and . Hence

**Case II:**

Then the solution is of the form . Again considering the boundary conditions,

and .

**Case III:**

The solution will be of the form .

From the boundary conditions,

and

This means either or

Hence .