STREAM LINES

Fluid Mechanics

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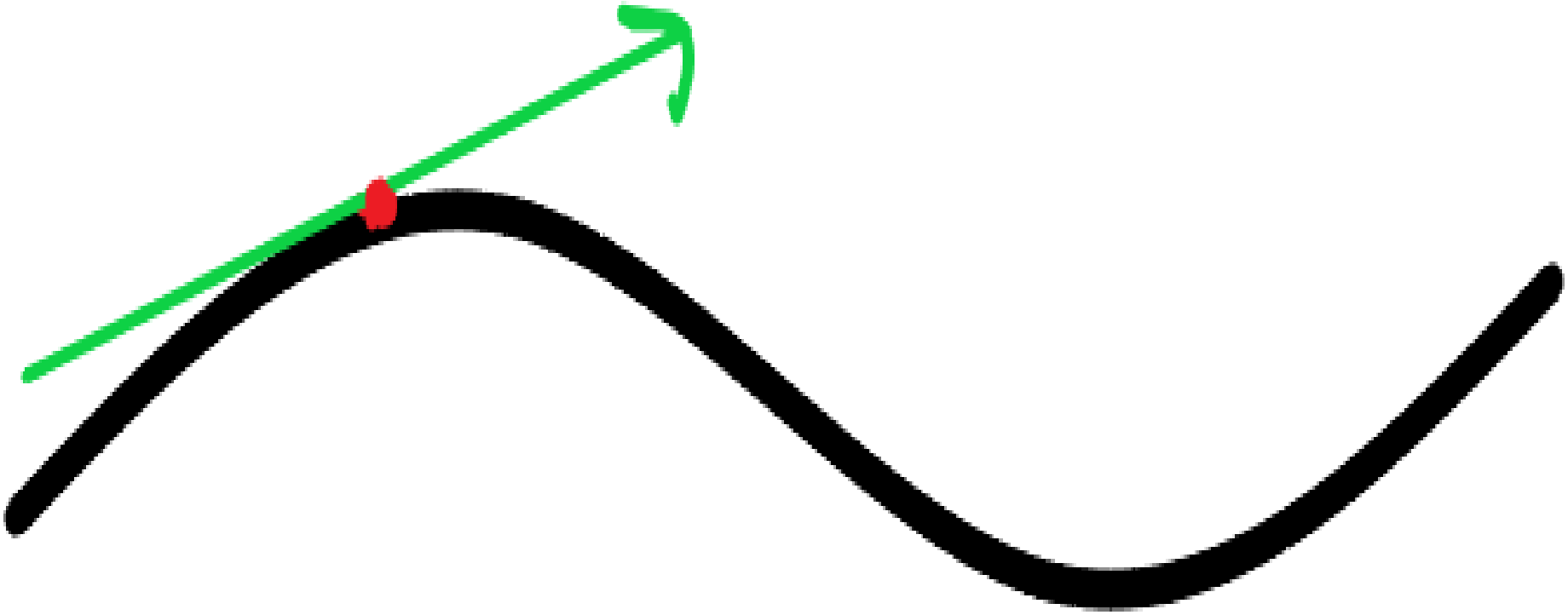
- **Streamlines, streaklines and pathlines** are field lines in a fluid flow. They differ only when the flow changes with time, that is, when the flow is not steady

- In steady flow (when the velocity vector-field does not change with time), the streamlines, pathlines, and streaklines coincide

It is an imaginary line drawn in the flow field such that the tangent drawn at it in any point represents the direction of velocity vector of the fluid particle at that point



Streamlines are a family of curves that are instantaneously tangent to the velocity vector of the flow. These show the direction in which a massless fluid element will travel at any point in time

Streaklines are the loci of points of all the fluid particles that have passed continuously through a particular spatial point in the past. Dye steadily injected into the fluid at a fixed point extends along a streakline.

Pathlines are the trajectories that individual fluid particles follow. These can be thought of as "recording" the path of a fluid element in the flow over a certain period. The direction the path takes will be determined by the streamlines of the fluid at each moment in time.