

Conservation law

In physics, a **conservation law** states that a particular measurable property of an isolated physical system does not change as the system evolves over time.

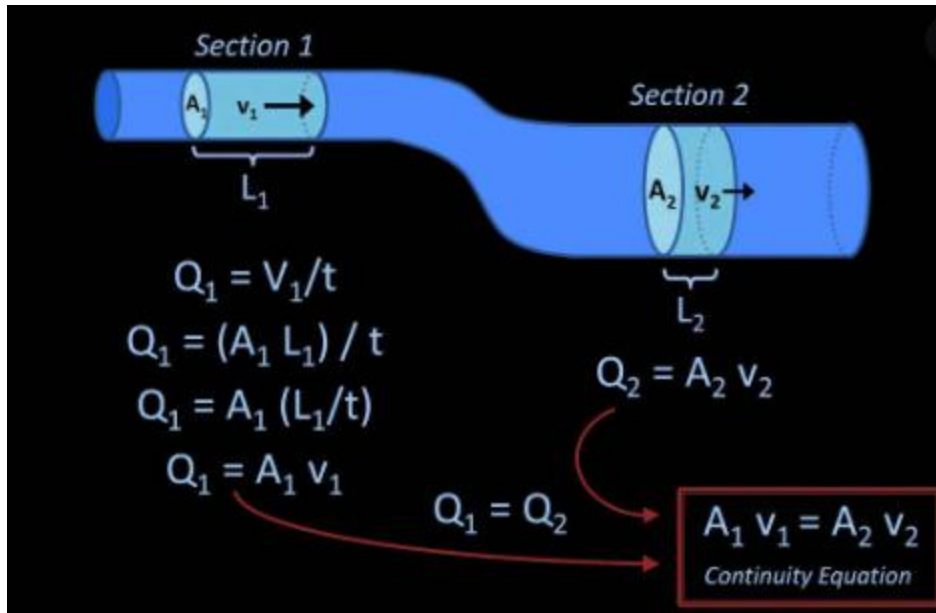
Fluid mechanics is the branch of physics concerned with the mechanics of fluids (liquids, gases, and plasmas)



$$\rho_2 A_2 v_2 = \rho_2 A_1 v_1$$

Same, incompressible, fluid so ρ drops out!

$$A_1 v_1 = A_2 v_2$$



The continuity equation

The velocity of a fluid in a steady flow at any point is inversely proportional to cross-sectional area of the tube at that point .

Based on the previous relation ($A_1 v_1 = A_2 v_2$) if :

The tube is cylindrical having two cross-sectional area one is wide and the other narrow.

$$A_1 v_1 = A_2 v_2$$

$$r_1^2 v_1 = r_2^2 v_2$$

The tube is branched into (n) branches of the same cross-sectional area .

$$A_1 v_1 = n A_2 v_2$$

$$r_1^2 v_1 = n r_2^2 v_2$$