Impulse - Momentum principle

Rate of change of momentum is directly proportional to the impressed force and takes place in some direction in which force acts

$$\text{Momentum} = m \times v$$

$$F = d/dt\,(m \times v).$$

differentiate $F = m\,dv/dt + v\,dm/dt.$

In applied mechanics, mass = Constant.

$$dm/dt = 0.$$

$$F = m\,dv/dt.$$

$$\therefore F = m\,dv/dt.$$

$$F = ma$$

In fluid mechanics mass flow is Constant, Fluid is Continous.

Equation of applied force.

$$F = m/t\,(V_1 - V_2)$$

Equation in terms of density & discharge.

$$\dot{m} = m/t = \rho v/t = \rho \cdot Q. \quad (\because \rho = m/v)$$

$$(m = \rho \cdot v)$$

$$(Q = v/t)$$

$$F = m/t\,(V_1 - V_2). \qquad F = \rho Q (V_1 - V_2)\ N.$$

force exerted by fluid on body