Equilibrium of Concurrent Force

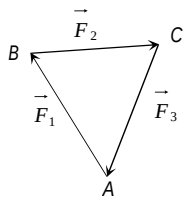
If all the forces working on a body are acting on the same point, then they are said to be concurrent.

A body, under the action of concurrent forces, is said to be in equilibrium, when there is no change in the state of rest or of uniform motion along a straight line.

The necessary condition for the equilibrium of a body under the action of concurrent forces is that the vector sum of all the forces acting on the body must be zero.

Mathematically for equilibrium $\sum \vec{F}_{net} = 0$ or $\sum F_x = 0$; $\sum F_y = 0$; , $\sum F_z = 0$

Three concurrent forces will be in equilibrium, if they can be represented completely by three sides of a triangle taken in order.



Lami's Theorem : For three concurrent forces in equilibrium $\frac{F_1}{\sin\alpha} = \frac{F_2}{\sin\beta} = \frac{F_3}{\sin\gamma}$