

Two objects of mass m_1 and m_2 are located at \mathbf{r}_1 and \mathbf{r}_2 , respectively. The force exerted on the body of m_1 due to that of m_2 is given by

$$\mathbf{F}_{12} = -G \frac{m_1 m_2}{r^2} \hat{\mathbf{r}}_{12}. \quad (1)$$

where $G \approx (20/3) \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$ is the universal gravitational constant, $r = |\mathbf{r}_1 - \mathbf{r}_2|$ is the distance from m_2 to m_1 , and $\hat{\mathbf{r}}_{12}$ is the unit vector of $\mathbf{r}_{12} \equiv \mathbf{r}_1 - \mathbf{r}_2$.