

Answer on Question #57741 - Physics - Mechanics – Relativity

Question:

What's the center of mass

Answer:

The **center of mass** of a body is weighted with the weight average positions of its mass points. For continuous mass distributions, the local agent of the density is defined as the center of mass. In a homogeneous body agrees with the center of mass with geometric center coincide. The bounceback constitutes an example of a non-homogeneous body.

Center of mass of N material points with masses m_i and each radius vector r_i is defined as:

$$r_c = \frac{1}{M} \sum_{i=0}^N m_i r_i = \frac{\sum_{i=0}^N m_i r_i}{\sum_{i=0}^N m_i}$$

because mass of N material points with masses m_i is the sum of masses all points:

$$M = \sum_{i=0}^N m_i$$

In the case of a solid body with a density $\rho(r)$:

$$r_c = \frac{\int \rho(r) r dV}{\int \rho(r) dV}$$