

2.6: Motion of finite-sized and many-body systems

Elementary presentations in classical mechanics discuss motion and forces involving single point particles. However, in real life, single bodies have a finite size introducing new degrees of freedom such as rotation and vibration, and frequently many finite-sized bodies are involved.

A finite-sized body can be thought of as a system of interacting particles such as the individual atoms of the body. The interactions between the parts of the body can be strong which leads to rigid body motion where the positions of the particles are held fixed with respect to each other, and the body can translate and rotate. When the interaction between the bodies is weaker, such as for a diatomic molecule, additional vibrational degrees of relative motion between the individual atoms are important. Newton's third law of motion becomes especially important for such many-body systems.

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