

CHAPTER OVERVIEW

6: Motion in a Resisting Medium

In studying the motion of a body in a resisting medium, we assume that the resistive force on a body, and hence its deceleration, is some function of its speed. Such resistive forces are not generally conservative, and kinetic energy is usually dissipated as heat. For simple theoretical studies one can assume a simple force law, such as the resistive force is proportional to the speed, or to the square of the speed, or to some function that we can conveniently handle mathematically. For slow, laminar, nonturbulent motion through a viscous fluid, the resistance is indeed simply proportional to the speed, as can be shown at least by dimensional arguments. One thinks, for example, of Stokes's Law for the motion of a sphere through a viscous fluid. For faster motion, when laminar flow breaks up and the flow becomes turbulent, a resistive force that is proportional to the square of the speed may represent the actual physical situation better.

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