

MECHANICS

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CONTENTS

1	The Equations of Motion	1
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THE EQUATIONS OF MOTION

The position of a particle in three-dimensional Euclidean space is defined by its radius vector \mathbf{r} , whose components are its Cartesian coordinates x , y , and z . The derivative $\mathbf{v} = d\mathbf{r}/dt$ of \mathbf{r} with respect to time t is the velocity of the particle, and the second derivative $d^2\mathbf{r}/dt^2$ is its acceleration. We denote differentiation with respect to time by \mathbf{v}