

Vectors, Geometry and Dynamics

Geometric representation of vectors in 1 - 3 dimensions, components, direction cosines. Addition, Scalar, multiplication of vectors, linear independence. Scalar and vector products of two vectors. Differentiation and integration of vectors with respect to a scalar variable. Two-dimensional co-ordinate geometry. Straight lines, circles, parabola, ellipse, hyperbola. Tangents, normals, Kinematics of a particle. Components of velocity and acceleration of a particle moving in a plane. Force, momentum, laws of motion under gravity, projectiles, resisted vertical motion. Angular momentum. Simple harmonic motion, elastic string, simple pendulum, impulse. Impact of two smooth sphere and of a sphere on a smooth surface.