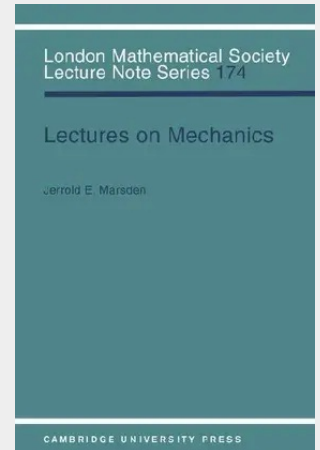


Lectures on Mechanics

The use of geometric methods in classical mechanics has proven to be a fruitful exercise, with the results being of wide application to physics and engineering. Here Professor Marsden concentrates on these geometric aspects, and especially on symmetry techniques. The main points he covers are: the stability of relative equilibria, which is analyzed using the block diagonalization technique; geometric phases, studied using the reduction and reconstruction technique; and bifurcation of relative equilibria and chaos in mechanical systems. A unifying theme for these points is provided by reduction theory, the associated mechanical connection and techniques from dynamical systems. These methods can be applied to many control and stabilization situations, and this is illustrated using rigid bodies with internal rotors, and the use of geometric phases in mechanical systems. To illustrate the above ideas and the power of geometric arguments, the author studies a variety of specific systems, including the double spherical pendulum and the classical rotating water molecule. This book, based on the 1991 LMS Invited Lectures, will be valued by pure and applied mathematicians, physicists and engineers who work in geometry, nonlinear dynamics, mechanics, and robotics.

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