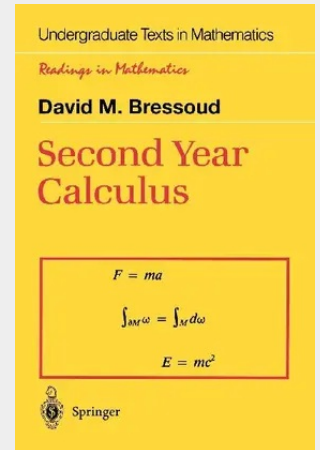


Second Year Calculus

From Celestial Mechanics to Special Relativity

Second Year Calculus: From Celestial Mechanics to Special Relativity covers multi-variable and vector calculus, emphasizing the historical physical problems which gave rise to the concepts of calculus. The book carries us from the birth of the mechanized view of the world in Isaac Newton's Mathematical Principles of Natural Philosophy in which mathematics becomes the ultimate tool for modelling physical reality, to the dawn of a radically new and often counter-intuitive age in Albert Einstein's Special Theory of Relativity in which it is the mathematical model which suggests new aspects of that reality. The development of this process is discussed from the modern viewpoint of differential forms. Using this concept, the student learns to compute orbits and rocket trajectories, model flows and force fields, and derive the laws of electricity and magnetism. These exercises and observations of mathematical symmetry enable the student to better understand the interaction of physics and mathematics.

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