# Variations on a Theme by Kepler

By Victor Guillemin, Shlomo Sternberg

American Mathematical Society. Paperback. Book Condition: new. BRAND NEW, Variations on a Theme by Kepler, Victor Guillemin, Shlomo Sternberg, This book is based on the Colloquium Lectures presented by Shlomo Sternberg in 1990. The authors delve into the mysterious role that groups, especially Lie groups, play in revealing the laws of nature by focusing on the familiar example of Kepler motion: the motion of a planet under the attraction of the sun according to Kepler's laws. Newton realized that Kepler's second law--that equal areas are swept out in equal times--has to do with the fact that the force is directed radially to the sun. Kepler's second law is really the assertion of the conservation of angular momentum, reflecting the rotational symmetry of the system about the origin of the force. In today's language, we would say that the group $O(3)$ (the orthogonal group in three dimensions) is responsible for Kepler's second law. By the end of the nineteenth century, the inverse square law of attraction was seen to have $O(4)$ symmetry (where $O(4)$ acts on a portion of the six-dimensional phase space of the planet). Even larger groups h The remainder of the book is aimed at specialists.It begins with...

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