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| | Sommario/riassunto | Based on information theory, a number of entropy measures have been proposed since the 1990s to assess systems' irregularity, such as approximate entropy, sample entropy, permutation entropy, intrinsic mode entropy, and dispersion entropy, to cite only a few. Among them, sample entropy has been used in a very large variety of disciplines for both univariate and multivariate data. However, improvements to the sample entropy algorithm are still being proposed because sample entropy is unstable for short time series, may be sensitive to parameter values, and can be too time-consuming for long data. At the same time, it is worth noting that sample entropy does not take into account the multiple temporal scales inherent in complex systems. It is maximized for completely random processes and is used only to quantify the irregularity of signals on a single scale. This is why analyses of irregularity-with sample entropy or its derivatives-at multiple time scales have been proposed to assess systems' complexity. This Book presents contributions related to new and original research based on the use of sample entropy or its derivatives. |