Mathematical Foundation of Information Theory
A Set Theoretical Approach

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Since years we are seeking a unified approach putting together the different views of information into one concept without great success. There is one main reason for that: the absence of a clear and simple phenomenological foundation of the basic concepts together with a corresponding mathematical structure describing it. Both have been elaborated by the author of that abstract within a doctoral thesis done at university of Berne, Switzerland in 1995 [2]. The mathematical part of that work (chapter 4.4. in [2]) was never published or presented within a conference. That approach shows a mathematical structure based on set theory that defines information as an interdisciplinary concept showing the different facets of it such as
the structural-attributive information,
the functional-cybernetic information,
the information carrier,
the basic unit of information, and
the measure of information.

Using some easily equation transformation the second principle of thermodynamics (called first principle of information theory) is provable by the formula for the measure of information.