

Analysis Encyclopedia Article

Analysis

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Analysis

The word analysis comes from the Greek "analyein," which means "to break up." The basic meaning of the word is the separation of a whole into its component parts. While it is used generally in both the natural and the social sciences in several different ways, in mathematics the term analysis generally refers to the examination of **functions** of real or complex variables arising from differential and integral **calculus** including the individual elements of the functions and their relationships to each other. Technically speaking, this branch of mathematics deals with how functions converge, toward **limits** and with other limit processes. This means that analysis may be regarded as a branch of **topology**.

Analysis includes a number of techniques which act as tools to allow scientists to determine the significance of values, actions, and reactions. The various ways natural and social scientists analyze the results of experiments, observations, and so forth in the different disciplines usually include mathematical reduction of data gathered by measurement of physical phenomena, observation of processes, and statistical analysis of behavior patterns, changes, and other trends. Thus, mathematical analysis has practical applications in many fields. As phenomena from these fields are studied in detail, predicted results, reactions, or patterns are compared to real outcomes. From these comparisons, **equations** often result that can be used to explain the observations or predict future results when new conditions are introduced into a situation.