

Louis Narens
Professor
Cognitive Science
University of California, Irvine

Title: Generalized Symmetry

Abstract: Symmetry -- invariance under a group of transformations -- has been a powerful mathematical tool that has transformed physics and is finding important applications in other parts of science, including the behavioral sciences. In physics, it is used to characterize possible physical laws; in psychophysics, it is used to characterize lawful relationships between sensations and stimuli. A problem with it as a general foundational concept outside of physical science is the often lack of a rich groups underlying phenomena of interest. This suggests a need for a generalized concept of "symmetry". Mathematicians have attempted this for well over a hundred years. While there has been some success in this by mathematicians, it has not translated into successes for broadening the relationship between symmetry and scientific laws as found in physics. This talk suggests a foundation for such a broadening through understanding invariance as a set of logical principals.