

# A Mathematical Framework for a Unified Understanding of Mind and Matter:

## The Analytic Network Process and its Generalization

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### Abstract

The outcomes of the AHP/ANP when applied to the measurement of intangibles are normalized priorities. Priorities cannot be forced into a Cartesian system of coordinates. Science does not deal with intangibles and as a result uses Cartesian axes with arbitrary units to measure tangibles which in the end must always be interpreted. Where does the AHP/ANP with its generalization to stimulus response and the derivation rather than experimental discovery of natural law fit into the larger picture of scientific measurement?

Continuous comparisons are represented by Fredholm's equation of the second kind. A necessary condition for the solution of this equation is that a functional equation of proportionality,  $w(x) = \lambda \int K(x,y)w(y)dy$  should hold. Solutions of this functional equation in the real and in the complex domains provide us respectively with the inverse square natural law and about Dirac type distributions that represent firings of neurons in response to stimuli. Generalization of the equation to a proportionality functional equation in operators gives us solutions that determine the patterns of all responses to stimuli including the patterns or forms mathematics takes when applied in science. A pair of similar equations that involve dependence between stimulus and response have been recently solved.

Keywords: Structures in AHP/ANP, generalization of ANP to continuous judgments, functional equation of proportionality, Cartesian coordinate and hierarchies, influence, mind and matter, intangibles, relative measurement