

Handbook of the Mathematics of the Arts and Sciences

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Aims and Scope:

Mathematics has been ubiquitous with the progress of humanity as the background of advances in navigation, actuarial sciences, economics, art, architecture, sciences, and even warfare. The progression of humanity from hunter-gather societies onto societies with sophisticated astronomical calendars, visually pleasing architectural forms (temples, mosques, cathedrals etc) reveals our quest to understand the cosmos, our attempts to represent and symbolize it via patterns, symmetries and structure. The interplay of mathematics, arts and sciences is found in attempts to answer timeless fundamental questions related to ontology, disciplinary methodologies and epistemology.

The attempts of the thinkers of the Renaissance (for instance) serves as a reminder that modern disciplinary silos of theologian, mathematician, scientist, inventor, painter, chemist, biologist, lawyer, philosopher, economist, political theorist etc., is "artificial" since these thinkers viewed themselves as philosophers in the pursuit of Knowledge, Truth and Beauty and were polymaths of the highest order. The tension between the disciplines that came out of the Renaissance, namely natural philosophy-art - alchemy (metallurgy/chemistry)- theology during the post Renaissance continues today in the modern day antipathy between the ever increasing sub-disciplines within arts, science, mathematics and philosophy. Models and Theory building lie at the intersection of art-science-mathematics. The history of model building in science conveys awareness of domain limitations. Arts imagine possibilities, science attempts to generate models to test possibilities, mathematics serves as the tool. By building bridges today between disciplines, the greatest benefactors are the potential innovators of tomorrow.

This goal of this Handbook is to become an authoritative source with chapters that show the origins, unification, and points of similarity between different disciplines and mathematics. Some chapters will also show bifurcations and the development of disciplines which grow to take on a life of their own. Science and Art are used as umbrella terms to encompass the physical, natural and geological sciences, as well as the visual and performing arts.

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