2nd International Conference on Physics and its Applications

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On the Algebraic Structure of General Mechanics

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Abstract:

Using ideas of Strocchi, lochum & Loupias, and Faddeev & Yakubovskii, we give an operational derivation of the Jordan-Banach algebra structure of the kinematics of (bounded) observables in a general theory of mechanics (classical and quantum) from a set of four axiomatic assumptions. The central tools are the duality pairing between states and observables given by expectation values, the operational association of these expectation values with measurement outcomes in experiments and polynomial rescalings of observable measuring devices. We then discuss how to include time evolution via a fifth axiom for an h-bar-dynamical correspondence via Alfsen & Schultz. This is current joint work with Shadi Ali Ahmad '22.

Biography:

Associate Professor of Mathematics at Dartmouth College. Research interests in operator algebras, noncommutative geometry, functional analysis and mathematical physics.

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