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The quantal algebra and abstract equations of motion SAMIR LIPOVACA — Classical and quantum mechanics common characteristics reveal core physics features that are hidden by the details related to the realizations of those theories in phase and Hilbert space respectively. The quantal algebra combines classical and quantum mechanics into an abstract structurally unified structure. It is based on two observations which can be made about classical and quantum mechanics. The first observation is that classical and quantum mechanics use two products: one symmetric and one anti-symmetric. The second observation is that classical and quantum mechanics obey the so-called composability principle: any two physical systems can interact with each other. The local structure of spacetime is contained in the quantal algebra without having been postulated. We will generalize classical and quantum mechanics equations of motion to abstract equations of motion in which the anti-symmetric product of the quantal algebra plays a central role. We will express the defining identities of the quantal algebra in terms of the abstract derivation. In this form it is easy to see that the first defining identity (the Jacobi identity) captures the essence of the Bianchi identity in general relativity which is one set of gravitational field equations for the curvature tensor.

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