

## **Hyperincursive Discrete Harmonic Oscillator**

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### **Abstract**

The hyperincursive algorithm for the discrete harmonic oscillator is perfectly stable and energy conserving. By identifying the natural parameters of the system, we transform the algorithm into a normal formalism based on dynamic equations of motion. We find that the simultaneous difference equations of motion are complex, that the natural parameters are classical analogues of the quantum mechanical creation and annihilation operators, and that the solution is of utmost simplicity. The methodology is applicable to any dynamical system, has conceptual importance for discrete physics, and practical utility for numerical simulations.