Unified discrete mechanics V: Deduction of the hyperincursive discrete time-dependent Maxwell equations and simulation of the hyperincursive discrete Maxwell electromagnetic wave equations

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Abstract.

In the preceding papers [1, 2] on unified discrete mechanics, we have proposed to extend the formalism of the hyperincursive discrete harmonic oscillator [3] to the Klein-Gordon equation. We have deduced the hyperincursive discrete Majorana quantum equations and then the hyperincursive discrete Dirac relativistic quantum equations.

This paper deals firstly with the deduction of the hyperincursive discrete time-dependent Maxwell equations in three spatial dimensions.

Then, we consider the simple case of the hyperincursive discrete Maxwell equations in one spatial dimension that are similar to the quantum Majorana and Dirac wave equations with a null mass.

Finally, this paper presents a series of simulations of the hyperincursive discrete Maxwell electromagnetic wave equations, which show the propagation of electric and magnetic fields.

References

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