

R008-03

C 会場 : 9/25 PM1 (13:45-15:30)

14:15~14:30

#梅田 隆行¹⁾, 尾崎 理玖¹⁾

⁽¹⁾ 名大 ISEE

A new integrator for relativistic equations of motion for charged particles

#Takayuki Umeda¹⁾, Riku Ozaki¹⁾

⁽¹⁾Institute for Space-Earth Environmental Research, Nagoya University

Numerical methods for solving the relativistic motion of charged particles with a higher accuracy is an issue for computational physics in various fields. The classic fourth-order Runge-Kutta method (RK4) has been used over many years for tracking charged particle motions, although RK4 does not satisfy any conservation law. However, the Boris method has been used over a half century in particle-in-cell plasma simulations because of its property of the energy conservation during the gyro motion.

In the present study, a new method for solving relativistic charged particle motions has been developed, which conserves both boosted Lorentz factor and kinetic energy during the gyro motion. The new integrator has the second-order accuracy in time and is less accurate than RK4. The new integrator is also extended to the fourth-order method by combining RK4.