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Verification and Convergence Properties of Particle-in-Cell Codes¹ STEPHANIE Y. SU, PSU, VIKTOR K. DECYK, WARREN B. MORI, UCLA — Particle-in-Cell (PIC) codes are widely used throughout plasma physics. Nevertheless, there is considerable confusion about what precisely is the mathematical model behind PIC codes and whether PIC codes converge to such a model. This numerical study is intended to shed light on these issues. Our basic hypothesis is that a Klimontovich equation with finite-size particles is the basic mathematical model behind PIC codes. A gridless particle code is first used to establish basic convergence to that model and then PIC codes are compared to it.

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