BOLTZMANN–PICARD–VOLTERRA HEREDITARY DEFINING RELATIONS IN THE ELECTRODYNAMICS OF PHYSICAL SYSTEMS WITH MEMORY

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S u m m a r y

By the example of ferromagnetics with their clearly pronounced nonlinearity and hysteresis, we show the fundamental role of material relations supplementing the Maxwell's equations in the electrodynamics of continua and bodies with memory in the form given by Boltzmann–Picard–Volterra. The analytic formula for S-like loops of hysteresis is constructed within a developed phenomenological model. Analogous models can be developed also for the other physical systems, whose character is similar to that of ferromagnetics; for example, for ferroelectrics. We present a number of motivated arguments concerning the transformation of trial models to "working ones" and discuss the complete system of original evolutionary relations of the electrodynamics of physical systems with memory.