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Essential Graduate Physics

Lecture Notes and Problems

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Part EM:
Classical Electrodynamics

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Supplemental file **Exercise Problems with Model Solutions** (300 problems, 420 pp.)
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Additional file **Test Problems with Model Solutions** (52 problems, 46 pp.)
is available for course instructors from the author upon request – see *Front Matter*.

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Introductory Remarks

The structure of this classical electrodynamics course is quite traditional. Namely, in order to address the most important subjects of the field, which involve not only charged point particles but also conducting, dielectric, and magnetic media, the electromagnetic interactions are discussed in parallel with simple models of the electric and magnetic properties of most common materials.

Also following tradition, I use this part of my series (notably Chapter 2) as a convenient platform for the discussion of various methods of the solution of partial differential equations, including the use of the most important systems of curvilinear orthogonal coordinates and special functions.

One more traditional part of classical electrodynamics is an introduction to special relativity (in Chapter 9) because although this topic includes a substantial classical mechanics component, it is the electrodynamics that makes a relativistic analysis unavoidable.