

CHAPTER OVERVIEW

2: Charges and Conductors

This chapter will start a discussion of the very common situations when the electric charge distribution in space is not known a priori, but rather should be calculated in a self consistent way together with the electric field it creates. The simplest situations of this kind involve conductors, and lead to the so-called boundary problems in which partial differential equations describing the field distribution have to be solved with appropriate boundary conditions. Such problems are also broadly used in other parts of electrodynamics (and indeed in other fields of physics as well), so that following tradition, I will use this chapter's material as a playground for a discussion of various methods of boundary problem solution, and the special functions most frequently encountered in the process.

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Thumbnail: Electric field lines due to a point charge in the vicinity of PEC regions (shaded) of various shapes. (CC BY SA 4.0; K. Kikkeri).

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