



# Electromagnetism 3

## Problem Set 3

Electric Multipoles, Electrostatic of Dielectric

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Due Date: 12th November 2024

### 1 A Black Box of Charge

Problem 4.18 of Zangwill 2013.

### 2 Reducible and Irreducible Multipole Expansion

Problems 4.3 of Jackson 1999.

### 3 A Theorem about the Origin Dependence of Multipoles

Problems 4.4 of Jackson 1999.

### 4 Torque and Force on Charged distribution

Problem 4.5 of Jackson 1999.

### 5 Cylindrical Dielectric Shell in Uniform Electric Field

Problems 4.8 of Jackson 1999.

### 6 Dielectric Between two Concentric Spheres

Problems 4.10 of Jackson 1999.

### 7 Stress Tensor\* Proof of No Self-Force

Problem 4.4 of Zangwill 2013.

\*"Electric stress tensor" formalism is discussed in section 3.7 of Zangwill 2013.