

Examination like tasks workshop 3 (Lecture 5 and 6)

A/

Find the field from a quadropole by direct calculation of E from each charge. Work in the simplest nonvanishing-field direction.

B/

In a lab coupling we have a coaxial cable with capacitance C_{cable} , connected with a BNC contact in each end. The BNC connections have imperfect contact (most do actually), meaning that we have a resistive layer between the cores and between the shield conductors. How would you model the capacitance of the entire coupling?

C/

Find the force between two dipoles lined up: -- distance= L -- as function of L

D/

In an xyz coordinate system we have a grounded, conducting plane $z=0$ (i e the xy plane) and a rod along the z axis starting at $z=a$ and ending at $z=2a$ having a charge per length = λ .

E/

Calculate a numerical approximation (order of magnitude) on the maximum mechanical torque on monocystal of 1 cm^3 of a material with $\epsilon_r = 5$ placed in a homogenous field $E = 1 \text{ MV/m}$