

TOPIC 11. INTERMEZZO: A LITTLE PROBLEM IN ANALYTIC GEOMETRY

A lamp on a desk by a wall has a vertical cylindrical shade of certain radius and height with a bulb (all relevant parameters are given below). With the light on, there is a region on the wall illuminated by the lamp, and a region in shadow. The problem is to find an equation describing the boundary between light and shadow.

The cartesian coordinates are set up so that $\{z = 0\}$ is horizontal, the wall is the plane $\{y = 0\}$ and the bulb is at $(0, 1, 1)$. The shade is a cylinder with vertical central axis (parallel to the z -axis), of radius $3/4$ and height 2 ; its center is the bulb.

