

Exercise 9

- (a) For any solution of the three-dimensional wave equation with initial data vanishing outside some sphere, show that $u(x, y, z, t) = 0$ for fixed (x, y, z) and large enough t .
- (b) Prove that $u(x, y, z, t) = O(t^{-1})$ *uniformly* as $t \rightarrow \infty$; that is, prove that $t \cdot u(x, y, z, t)$ is a bounded function of x, y, z , and t . (*Hint:* Use Kirchhoff's formula.)