M.Eng. Project Presentation Announcement
Dept. of Electrical and Computer Engineering

Project Title Goes Here

By

Student's Name Goes Here

Faculty Advisor: Prof. Goes Here

8:00 a.m., Thursday, April 3, 2001

ECE Room 512

Abstract

In many applications it is necessary to determine coupling from a line current source to a nearby wire. Applications include current coupling in high-speed interconnects and wire interaction with a charged particle beam. A common physical configuration occurs when the source and wire are perpendicular to each other. In this work, we investigate the scattered field and coupled current that result from such a configuration. We solve the problem for three different sources: a dipole, an array of dipoles, and a continuous line current. We detail the solution for the line current source where we obtain the scattered field by numerical integration, the far-zone approximation using steepest descents, and the excited current by numerical integration. We also show that the solution of an infinite number of phased dipoles approaches the continuous line source excitation. For the continuous line source case, we assume an infinite traveling wave line current. We also assume that the current magnitude and phase are not affected by the existence of the nearby wire. The current travels with a speed less than the speed of light in the surrounding medium. The wire is infinitely long and infinitesimally thin, and is located a distance "d" from the line source. We solve for the scattered field both numerically and approximately using steepest descents. We then add corrections to the saddle point approximation through two different approaches. We also solve numerically for the coupled current on the wire. Finally, we produce plots that allow us to compare the levels of the field with and without the wire present. Our problem could serve as a prelude to investigation of a traveling wave of current and an array of parallel wires. However, such a problem is quite different since the physical configuration would then allow the presence of guided waves.

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