hossam maghraby

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

hossam maghraby

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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بالرسالة صفحات لم ترد بالأصل

ANALYSIS AND DESIGN TECHNIQUES OF MULTILAYERED MICROSTRIP ANTENNAS AND ARRAYS FOR DUAL POLARIZED APPLICATIONS

By

Tarek Ali El Sayed El Moselhy
B.Sc. in Electronics and Communications Engineering – Cairo University

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
Master of Science
in
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Faculty of Engineering, Cairo University
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ABSTRACT

Microstrip antennas could be the only antenna that can be easily manufactured in an accurate repeatable way because of the recent advances in printed circuit technology. However, conventional microstrip antennas do not fulfill many of the recent wireless communication requirements. In some applications (e.g. Satellite TV) the antenna has to be dual polarized. Special techniques have to be developed in order to fulfill such challenging requirements. Some new techniques are investigated in this thesis. The thesis consists of two parts discussing the analysis and design techniques of multi-layered microstrip antennas and arrays for dual polarized applications.

In the first part, a full-wave moment-method code has been developed to simulate microstrip structures embedded in multilayered dielectric substrates. Recent advances in CAD field have been used to eliminate the need for any numerical integrations, thus increasing the computational efficiency of the code. Several approximation techniques have been adopted to decrease the matrix fill time. The code has been validated by comparing it to a commercially available software package "IE3D" from Zeland, Inc.

In the second part of the thesis, new configurations of dual polarized (linear & circular) antennas have been developed. The design parameters of these configurations and their effect on the antenna performance have been studied and optimized at the Ku-frequency band (10.75 – 12.75 GHz). Integration of such elements in antenna arrays have been investigated and complexities of conventional array feed networks have been presented. Design techniques for efficient simplified feed networks have been invented. Special array configurations have been optimized for Satellite TV applications to replace conventional dishes.

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