



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



HANAA ALY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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VOLUME INTEGRAL EQUATIONS FORMULATION FOR PLASMONIC NANO DEVICES IN LAYERED MEDIA

By

Esraa Mohamed Abdelkhaleq Mahdy

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
Engineering Physics

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Volume Integral Equations Formulation for Plasmonic Nano Devices in Layered Media

Key Words:

Plasmonics; Volume Integral Equations; Discrete Complex Images; Method of Moments; Nanoantennas

Summary:

This thesis presents a volume integral equation formulation for plasmonic nano devices in planar multilayered media. This integral equation is solved numerically using the Method of Moments (MoM). The proposed formulation is used to study different nano structures immersed inside layered media. The structures include nano-rods in layered medium excited by plane wave, nano patch antenna in layered medium excited by plane wave, nano patch antenna in layered medium excited by transmission line, and two coupled nano patch antennas located at both side of a substrate and excited with transmission lines. The obtained current distributions and S-parameters are compared with those obtained using CST Microwave Studio. A very good agreement is concluded.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Esraa Mohamed Abdelkhaleq Mahdy

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Dedication

To my family and friends

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Table of Contents

DISCLAIMER	I
DEDICATION	II
ACKNOWLEDGMENTS.....	III
TABLE OF CONTENTS.....	V
LIST OF TABLES.....	VII
LIST OF FIGURES.....	VIII
LIST OF SYMBOLS AND ABBREVIATIONS.....	XI
ABSTRACT	XV
CHAPTER 1 : INTRODUCTION	1
1.1. METALS AT OPTICAL FREQUENCIES.....	1
1.2. APPLICATIONS OF PLASMONICS	1
1.3. COMPUTATIONAL ELECTROMAGNETICS.....	3
1.4. GREEN’S FUNCTIONS	4
1.5. ORGANIZATION OF THE THESIS	5
CHAPTER 2 : SPECTRAL DOMAIN GREEN’S FUNCTIONS	7
2.1. INTRODUCTION	7
2.2. ELECTROMAGNETIC FIELDS IN THE SPECTRAL DOMAIN.....	7
2.3. TE-z AND TM-z SYSTEMS DECOMPOSITION	10
2.3.1. TE-z system	10
2.3.2. TM-z system	11
2.4. BOUNDARY CONDITIONS AT THE LAYERS’ INTERFACES	11
2.4.1. Boundary Conditions for TE-z System.....	12
2.4.2. Boundary Conditions for TM-z System.....	12
2.5. EXTRACTING TE/TM CURRENTS FROM ORIGINAL CURRENTS.....	13
2.6. SYSTEM SOLUTIONS.....	13
2.6.1. TE System Solution	13
2.6.2. TM System Solution	16
2.7. COMBINATIONS OF TE-z AND TM-z ELECTROMAGNETIC FIELDS	18
2.8. SPECTRAL DOMAIN GREEN’S FUNCTION FOR LAYERED MEDIA OF PRACTICAL IMPORTANCE 20	
2.8.1. HED on Top of Finite Substrate	20
2.8.1.1. Spectral Green’s Functions in the Half-Space above the Source.....	21
2.8.1.2. Spectral Green’s Functions in the Half-Space below the Source.....	21
2.8.2. Two HEDs at both Sides of Finite Substrate	22
2.8.2.1. Spectral Green’s Functions due to Source ‘a’ in the Medium containing Source ‘a’	23
2.8.2.2. Spectral Green’s Functions due to Source ‘b’ in the Medium Containing Source ‘a’	23
2.8.2.3. Spectral Green’s Functions due to Source ‘a’ in the Medium containing Source ‘b’	25
2.8.2.4. Spectral Green’s Functions due to Source ‘b’ in the Medium containing Source ‘b’	26

CHAPTER 3 : SPATIAL DOMAIN GREEN’S FUNCTIONS	27
3.1. INTRODUCTION	27
3.2. FOURIER TRANSFORMATION AND SOMMERFELD INTEGRAL.....	27
3.2.1. Quasi-Dynamic Images Extraction	28
3.2.2. Discrete Complex Images	29
3.3. SPATIAL DOMAIN GREEN’S FUNCTIONS FOR LAYERED MEDIA OF PRACTICAL IMPORTANCE 31	
3.3.1. Source on Top of a Finite Substrate.....	31
3.3.1.1. Spatial Green’s Functions in the Half-Space above the Source.....	31
3.3.1.2. Spatial Green’s Functions in the Half-Space below the Source.....	35
3.3.2. Two Sources at both Sides of Finite Substrate	37
3.3.2.1. Spatial Green’s Functions due to Source ‘a’ at the Medium containing Source ‘a’	37
3.3.2.2. Spatial Green’s Functions due to Source ‘b’ at the Medium containing Source ‘a’	37
3.3.2.3. Spatial Green’s Functions due to Source ‘a’ at the Medium containing Source ‘b’	43
3.3.2.4. Spatial Green’s Functions due to Source ‘b’ at the Medium containing Source ‘b’	46
CHAPTER 4 : INTEGRAL EQUATIONS FORMULATION AND THE METHOD OF MOMENTS	51
4.1. INTEGRAL EQUATIONS FORMULATION.....	51
4.2. METHOD OF MOMENTS (MoM)	52
4.2.1. Plasmonic Nano Rod in Free Space and Illuminated by Plane Wave.....	54
4.2.2. Plasmonic Nano Rod above Finite Substrate and Illuminated by Plane Wave....	56
4.2.3. Rectangular Patch on Top of Finite Substrate and Fed with Transmission Line.	58
4.2.4. Two Patches at both Sides of a Finite Substrate	61
CHAPTER 5 : RESULTS AND DISCUSSION.....	67
5.1. PLASMONIC NANO ROD IN FREE SPACE ILLUMINATED BY PLANE WAVE	67
5.2. PLASMONIC NANO ROD ABOVE FINITE SUBSTRATE ILLUMINATED BY PLANE WAVE	69
5.3. RECTANGULAR PATCH ON TOP OF FINITE SUBSTRATE AND ILLUMINATED BY PLANE WAVE.....	71
5.4. RECTANGULAR PATCH ON TOP OF FINITE SUBSTRATE FED WITH TRANSMISSION LINE.....	75
5.5. ELECTROMAGNETICALLY COUPLED PATCHES AT BOTH SIDES OF A FINITE SUBSTRATE.....	78
5.6. BAND-STOP FILTER.....	81
CHAPTER 6 : CONCLUSIONS.....	84
6.1. SUMMARY OF THE WORK.....	84
6.2. FUTURE WORK.....	85
REFERENCES	87

List of Tables

Table 3.1: Amplitudes and locations of the complex images for the spectral functions $\hat{R}_{1,1}$ and $\hat{R}_{3,1} - \hat{R}_{3q,1}$	35
Table 3.2: Amplitudes and locations of the complex images for the spectral functions $\hat{R}_1^{ab} - \hat{R}_{1q}^{ab}$ and $\hat{R}_3^{ab} - \hat{R}_{3q}^{ab}$	42
Table 5.1: Dimensions of the gold nano rod placed in free-space.	68
Table 5.2: Dimensions of the gold nano patch placed on top of SiO ₂ /Au substrate.	72
Table 5.3: Optimum dimensions of the patch nantenna and the feeding transmission line.	76
Table 5.4: Dimensions of the two electromagnetically coupled patches and the feeding transmission lines.	78
Table 5.5: Number of mesh cells and computation time required by CST for different substrate thicknesses to simulate two electromagnetically coupled patches fed with transmission lines located at both sides of a SiO ₂ finite substrate.	81
Table 5.6: Geometrical dimensions of the band-stop filter.	83

List of Figures

Figure 1.1: Trapping of light inside a photovoltaic solar cell by metallic nanoparticles [20].	2
Figure 1.2: Nano rods with cross section of a Split Ring Resonator [2].	3
Figure 1.3: Nanoantennas with resonance at the visible and infrared range for SERS and SEIRS, respectively [3].	3
Figure 2.1: A horizontal electric dipole (HED) impressed inside a multilayered media.	7
Figure 2.2: The inward and outward recursive method for finding the reflection and expansion coefficients of the TE system.	15
Figure 2.3: The inward and outward recursive method for finding the reflection and expansion coefficients of the TM system.	18
Figure 2.4: HED is located on top of a finite substrate.	20
Figure 2.5: Two HEDs located at the two sides of a finite substrate.	22
Figure 3.1: (a) The spectral function $\hat{R}_{3,1}$ versus k_ρ , (b) $\hat{R}_{3,1}$ after extracting the quasi-dynamic terms $\hat{R}_{3q,1}$.	33
Figure 3.2: (a) The spectral function $\hat{R}_1^{ab}$ versus k_ρ , (b) $\hat{R}_1^{ab}$ after extracting the quasi-dynamic terms $\hat{R}_{1q}^{ab}$.	40
Figure 3.3: (a) The spectral function $\hat{R}_3^{ab}$ versus k_ρ , (b) $\hat{R}_3^{ab}$ after extracting the quasi-dynamic terms $\hat{R}_{3q}^{ab}$.	41
Figure 4.1: Plasmonic gold rod in free-space.	51
Figure 4.2: Rectangular meshing of the structure and the basis functions: (a) Basis functions along x-direction, (b) Basis functions along y-direction, and (c) an x-directed basis function showed in 3-dimensional form.	52
Figure 4.3: Gold rod above a finite substrate backed by sufficiently thick ground.	58
Figure 4.4: Rectangular patch nano-antenna fed with transmission line on top of a SiO ₂ substrate: (a) cross-sectional view and (b) three-dimensional view.	59
Figure 4.5: Basis functions (rooftops) along the patch and the transmission line, x-directed basis functions in blue and y-directed ones in green, as well as the source function (half rooftop), in red, at the edge of the transmission line.	59