

金屬箔片插入式微波導波管濾波器之研究

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摘要

本文是對於金屬箔片插入式微波導波管進行研究。我?分析此結構和傳統帶通濾波器不同，使用波模匹配法分析濾波器的不連續面特性以及討論在不連續面波導問題之解決及探討一般總合波模之方法。這種結構具有半波長諧振腔加上插入金屬箔片完全對稱呈現出之特性。發展最佳化的設計程序和演繹法的使用對完成正確的濾波器設計是必要的。

關鍵詞：散射參數、奇(偶)模輸入阻抗、諧振腔

目錄

封面內頁 簽名頁 授權書.....	iii	中文摘要.....	iv	英文摘要.....	v	誌謝.....	vi	目錄.....	vii	圖目錄.....	ix	表目錄.....	x
Chapter1. Introduction.....	1	1.1 Motivation.....	1	1.2 Analysis.....	1	1.3 Organization of This Thesis.....	4						
Chapter2. Analysis of the Discontinuities.....	5	2.1 Introduction.....	5	2.2 Describe transverse fields.....	6	2.3 The waveguides coupling between junctions.....	7	2.4 Adding in the junctions.....	13	2.5 Condition of microwaves waveguides.....	14		
2.5.1 The form of the normal modes in the waveguide.....	15	2.5.2 Many guide junctions.....	16	2.5.3 The central plane description.....	17	2.6 The characterization of waveguide.....	17	2.6.1 Waveguide Filters in a centrally interface.....	18	2.6.2 Some length interface description.....	24	2.7 Impedance of filters.....	26
Chapter3. Design of waveguide microwaves filters.....	29	3.1 Design Procedure.....	29	3.2 Characterization of the best situation.....	35	3.3 Accordable Implementation.....	38	3.4 Application.....	44				
Chapter4.													
Conclusion.....	48	References.....	49										

參考文獻

- [1] Arndt , F. , “ The Status of Rigorous Design of Millimetre Wave Low Insertion Loss Finline and Metallic Filters , ” J.Instr.Electronics and Telecom.Engrs. , Vol.34 , No.2 , 1988 , pp.107-119
- [2] Y. Tajima and Y. Sawayama , “ Design and analysis of a waveguide sandwich microwave filter , ” IEEE Trans .Microwave Theory Tech ,vol .MTT-22,pp.839-841,Sept .1974 .
- [3] Beyer , A. , “ Calculation of Discontinuities in Grounded Finline Taking into Account the Metallization Thickness and the Influence of the Mount-Slits , ” Proc.12th European Microwave Conference , Helsinki , Finland , 1982 , pp.681-686.
- [4] R . Vahldicck , J .Bornemann , F , Arndt , and D .Grauerholz , “ Optimized waveguide E-plane metal insert filters for millimeterwave applications , “ IEEE Trans . Microwave Theory Tech , vol . MTT-31,pp.65-69,Jan.1983.
- [5] R . Levy , ” Theory of direct coupled cavity filters , ” IEEE Trans .Microwave Theory Tech , vol , MTT-15 ,pp,340 — 348,June 1967 .
- [6] R.E. Collin, Field Theory of Guided Waves. New York: McGraw-Hill, 1960.pp.409-452.
- [7] L. Lewin, “ On the resolution of a class of waveguide discontinuity problems by the use of singular integral equations, “ IRE Trans. Microwave Theory and Techniques, vo1. MTT-9, pp. 321-322, July1961
- [8] R.E. Collin, Field Theory of Guided Waves. New York: McGraw-Hill, 1960.pp.314-367.
- [9] S.W. Drab witch. “ Multimode antennas, ” Microwave J., vo1. 9, pp. 41-51.January 1966
- [10] J.B. Davies and C.A. Muilwyk, “ Numerical solution if uniform hollow waveguides and boundaries if arbitrary shape, “ Proc. IEE (London), vo1. 133. pp. 277-284, February 1966.
- [11] R.E. Collin, Field Theory of Guided Waves. New York: McGraw-Hill, 1960.pp.229-323.
- [12] P.M. Morse and H. Feshbach, Methods if Theoretical Physics. New York: McGraw-Hill, 1953, pp. 928-929.
- [13] C.E. Froberg, Introduction to Numerical Analysis. Reading, Mass.: Addison-Wesley, 1965, pp. 172-201, 221-225.
- [14] N. Marcuvitz, Waveguide Handbook. New York: McGraw-Hill, 1951, pp. 117-126.
- [15] E.L. Ginzton, Minzton, Microwave Measurements. New York: McGraw-Hill, 1957, pp. 317-329
- [16] C.E. Froberg, Introduction to Numerical Analysis. Reading, Mass.: Addison-Wesley, 1965, pp. 74-75.
- [17] N. Marcuvitz, Waveguide Handbook. New York: McGraw-Hill, 1951, pp. 172-174.
- [18] R . Levy , ” Theory of direct coupled cavity filters , ” IEEE Trans .Microwave Theory Tech , vol , MTT-15 ,pp,340 — 348,June 1967 .
- [19] R. Levy “ Tables of element values for the distributed low-pass prototype filter , ” IEEE Trans . Microwave Theory Tech , vol . MTT -13,pp,514 -536 ,Sept .1965 .

- [20] J. D. Rhodes , " Design formulas for stepped impedance distributed and digital wave maximally flat and Chebyshev low – pass prototype filters , " IEEE Trans . Circuits Syst , vol . CAS – 22 ,PP . 866 -874 .Now 1975 .
- [21] F . Amdt . " Status of the rigorous design of millimeter wave low insertion loss fin – line and metallic E-plane filters , " J .Instm . Electron . Eng , vol 34,pp.107-119,1988 .
- [22] Bornemann , J . , and F.Arndt , " Metallic E-Plane Filter With Cavities of Different Cutoff Frequency , " IEE Electronics Letters , Vol.22 , May 1986 , pp.524-525 [23] J.S. Hong , " Design of E plane filters made easy , " IEE Proc ,vol .136.pt .H,pp.215-218,1989.
- [24] J . S . Lim , C.W.Lee , and T Itoh . " An accurate CAD algorithm for E-plane type bandpass filters using a new passband correction method Combined with the synthesis procedures . " IEEE MTT . Symp .Dix , Dallas , TX ,1990 , pp.1179-1182 .
- [25] J . D .Rhodes , " Microwave circuit realizations . " D . V .Morgan and M . J .Howes (eds.). Microwave Solid State Devices and Applications . England ; Peregrinus , 1980 , pp .49-57 .
- [26] S . B .Cohn . " Generalized design of bandpass and other filters by computer optimization , " IEEE MTT .Symp .Dig . Atlanta GA ,1974 , pp.272- 274 .
- [27] R Levy , " Theory of direct – coupled – cavity filters , " IEEE Theory .Microwave Theory Tech . vol MTT -15 ,pp .340 -347 . 1967 .
- [28] V . P . Gololobov and M Y Omel Yanenko , Filters based on multilayered metallic structures in a waveguide , " Soviet J Commun Technol . Electron , vol 33 .pt . 8 , pp . 69 -74 ,1988.
- [29] K . C . Gupta , R Gary , and R Chadha , Computer – Aided Design of Microwave Circuits . Boston MA Artech 1981 , p 530 .
- [30] Tao , J.W. , and H.Baudrand , " Multimodal Variational Analysis of Uniaxial Waveguide Discontinuities , " IEEE Trans.Microwave Theory Tech.Vol.MTT-39 , March 1991 , pp.506-516.
- [31] Y . C . Shih The mode – matching method , " in T Itoh Ed Numerical Techniques for Microwave and Millimeter – wave Passive Structures .New York : Wiley , 1989 , pp 592 -621 .
- [32] M. Politi. G. B. Strcca A Melloni G. Macchiordla and G. G. Gentili " An equivalent for the design of E-plane metal – insert in millimeter wave applications , " Proc . 20 th European Microwave Conf Budapest ,Hungary , 1990 , pp 1257 -1262 .
- [33] J . M . Ortega and W . C . Rheinbold Iterative Solution of Nonlinear Equations in Several Variables , New York ; Academic , 1970 , p .181 .
- [34] V . P . Gololobov and M . Y . OmePYanenko " Bandpass filters based on planar metal – dielectric structures in the E-plane of a rectangular waveguide (A review) , " Radioelectron . Commun .Syst vol 30 , no , 1 , pp 1 -15 . 1987 .