Research of Waveguide Microwaves Filters with Metal Septum Inserts

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ABSTRACT

The thesis mainly focuses on the study of waveguide microwaves filters with metal septum inserts. We analyze the geometry of the metal septum inserts with the different in the conventional pass band waveguide filters. To analyze of filters discontinuities by the mode matching method and discuss the case for a complete change of emphasis in the solution of waveguide discontinuity problems and to present a general method of normal mode summation. The design of this structures are waveguide metal insert bandpass filters with half-wave resonators coupled with one another by means of longitudinally oriented. An optimization of the design procedure and the algorithm using is developed. The optimization often is required in practice for the accurate design of these filters.

Keywords : S parameters，Normalized Odd and Even impedance，Resonator

Table of Contents

REFERENCES

[1] Arndt，F.，“ The Status of Rigorous Design of Millimetre Wave Low Insertion Loss Finline and Metalic Filters，”J.Instn.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,Scpt .1974 .

[3] Beyer，A.，“ Calculation of Discontinuities in Grounded Finlines 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 distributcd and digital wave maximally flat and Chebyshew 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 millimeler wave low insertion loss fin – line and melallic E-plane tilters , ” J .lnsm . 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 tilters made easy , ” IEE Proc ,vol .136.pt .H.pp.215-218,1989.
[24] J. S . Lim , C.W.Lee , and T ltoh . “ An accurate CAD aigorithm for E-plane type bandpass titers using a new passband correetion method Comdined 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 Apptications . 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 tilters , “ IEEE Theory .Microwave Theory Tech . vol MTT -15 ,pp .340 -347 . 1967 .
[28] V. P. Gololobov and M Y Omel Yanenko , Filters based on multiayered 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 Sesign of Mocrowave 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 ltoh Ed Numerical Tehnniques 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 , “ Proe . 20 th Europeun Microwave Conf Budapest ,Hungary , 1990 , pp 1257 -1262 .
[33] J. M. Ortega and W. C. Rheinbold lterative Sohative of Nonlinear Equations in Sevetal Variables , New York ; Academic , 1970 , p .181 .
[34] V . P. Gololobov and M. Y. OmePYanenko “ Bandpass tilters based on planar metal – dielectric structures in the E-plane of a rectangular waveguide (A review) , “ Radioelectron . Commnun .Syst vol 30 , no , 1 , pp 1 -15 . 1987 .