APTEKAR', S.; KATSEN, L.

A norm plan for metallurgical machinery units. Sots.trud 4 no.9:87-91 S '59. (MIRA 13:1)
(Steel industry--Production standards)

SOROKIN, V.A., doktor tekhn.nauk; KARMAZIN, V.I., doktor tekhn.nauk; KATSEN, L.G., kand.tekhn.nauk; IVANOV, A.I., inzh.; OSTAPENKO, P.Ye., inzh.

Magnetized roasting of Krivoy Rog quartzites in a fluidized bed. Stal' 20 no. 12:1057-1060 D '60. (MIRA 13:12)

1. Mekhanobrchermet.
(Kriovy Rog--Quartziete) (Fluidization)

KATSEN, Leontiy Grigor'yevich; LUK'YANOV, Mikhail Razumovich; APTEKAR', Saveliy Semenovich; TERESHCHENKO, N.A., inzh., retsenzent; CHUMACHENKO, T.I., red.izd-va; BEREZOVYI, V.N., tekhn. red.

[Labor productivity in ferrous metallurgy in the Ukrainian S.S.R.] Proizvoditel'nost' truda v chernoi metallurgii USSR. Kiev, Gostekhizdat USSR, 1963. 218 p. (MIRA 16:4)
(Ukraine--Iron industry--Labor productivity)

KAZANTSEV, Yevgeniy Ivanovich. Prinimali uchastiye: ZEMLYANYY, N.G., inzh.; KATSEN, L.G., kand. tekhn. nauk; SEMIKIN, I.D., prof., retsenzent; STEPANOV, Ye.S., red.; SHKLOVSKAYA, I.Yu., red.izd-va; KOROVINA, N.A., tekhn.red.

[Industrial furnaces; handbook for their calculation and design] Promyshlennye pechi; spravochnoe rukovodstvo dlia raschetov i proektirovaniia. Moskva, Izd-vo "Metallurgiia," 1964. 451 p. (MIRA 17:4)

1. Dnepropetrovskiy metallurgicheskiy institut (for Semikin).

38325 KATSEN, L. YA.

Nakrovatnyy stolik dlya bol'nykh v kostnotuberkuleznykh sanatoriyakh. Problemy tuberkuleza, 1949, No 6, s. 61-62

L 26408-66 EWT(1)/FSS-2 WR Monograph UR 62 B+1

ACC NR: AM5025518

Katsenbogen, Mikhail Solomonovich

Characteristics of detection (Kharakteristiki obnaruzheniya) Moscow, Izd-vo "Sovetskoye radio", 1965. 95 p. illus., biblio., diagrs. 7500 copies printed

TOPIC TAGS: radar detection, radar engineering, radar signal processing, pulsed, radar, coherent radar, continuous radar

PURPOSE AND COVERAGE: This booklet is intended for engineers concerned with calculation, design, and operation of radar equipment. It may also be useful for students in this field. The booklet discusses detection characteristics of radar stations, such as relationships between the probability of correct detection and the normalized range for a wide range of values of integrable pulses and of false alarm probabilities. Flickers of signals reflected from real targets and the various methods of transmitted power-pulse and signal-processing techniques are taken into consideration. Theoretical material is presented in two chapters in order to explain the principles used to obtain the graphs. T. S. Zotova and M. P. Zhurolev participated in the calculation of detection characteristics. G. M. Zemlyanski constructed the range-calculation nomogram V. D. Zubakov and B. A. Smirenin read and corrected the manuscript. A. E. Basharinov, L. D. Gol'dshteyn, and V. I. Rakov provided comments and advice.

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UDC: 621.4.021

Card 1/2

L 26408-66
ACC NR: AM5025518

SUB CODE: 17/ SUBM DATE: 06Feb65/ ORIG REF: 014/ OTH REF: 011

KATSENBOGEN, N. Z.

PROCESSES AND PROPERTIES INDEX

31

Stabilizer for rubber dispersions and emulsions. N. Z. Katsenbogen. U.S.S.R. 65,699, Jan. 31, 1946. A black-liquor ext. is used to stabilize aq. dispersions and H_2O-benzene emulsions of rubber. M. Hosch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KATSENELENBAUM, B. Z.

PA 60T111

Dec 1947

USSR/Physics
Waves, Electromagnetic
Dielectrics

"The Distribution of Electromagnetic Waves Along Infinite Dielectrical Cylinders at Low Frequencies," B. Z. Katsenelenbaum, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVIII, No 7 pp. 1317-20

With very broad assumptions, shows that two polarized waves, with different forms, can be distributed along an infinite dielectrical bar. In general their speeds are different. Submitted by Academician M. A. Leontovich, 26 Jun 1947.

60T111

KATSENELENBAUM, B. Z.

USSR/Physics - Dielectrics
Wave Guide

Oct 49

"Symmetrical Excitation of an Infinite Dielectric Cylinder," B. Z. Katsenelenbaum, 10 pp

"Zhur Tekh Fiz" Vol XIX, No 10 pp. 1168-81

Discusses electromagnetic oscillations arising when an infinite dielectric cylinder is excited by an elementary dipole situated on its axis. In a cavity, the dipole creates a spherical wave throughout the space. In the presence of an infinite cylinder, plane waves form along with the spherical wave. Plane waves may be propagated along the dielectric cylinder under certain conditions. Studied

151T88

[redacted]

USSR/Physics - Dielectrics (Contd) Oct 49

structure of these waves, region of their formation, and distribution of energy between them. This problem is closely associated with Noether and Vladimirskiy's work on the excitation of a metallic cylinder and with Pistol'kors' work on the excitation of a cylinder made from magnetic material. Submitted 18 Oct 48.

USSR/Physics - Dielectrics
Wave Guide

Oct 49

"Nonsymmetrical Oscillations of an Infinite Dielectric Cylinder," B. Z. Katsenelenbaum, 10 pp

"Zhur Tekh Fiz" Vol XIX, No 10 - pp. 1182-91

Discusses free and forced nonsymmetrical oscillations of an infinite dielectric cylinder. Studied characteristic equation for nonsymmetrical plane waves propagated along the cylinder and structure of the wave field, classifying them completely. Solved problem on excitation of the cylinder by an elementary electric dipole placed on its axis for which nonsymmetrical plane waves are propagated along the

151T89

USSR/Physics - Dielectrics (Contd)

Oct 49

cylinder along with the spherical wave. Derived a general expression for the radiation resistance of a dipole placed in an arbitrary dielectric body whose dimensions are small compared with the wave length. Submitted 18 Oct 48.

151T89

KATSENELENBAUM B. Z.

KATSENELENBAUM, B. Z.

Mathematical Reviews
Vol. 14 No. 8
Sept. 1953
Mathematical Physics

Kacenelenbaum, B. Z. Wave guides with nonideal walls. Doklady Akad. Nauk SSSR (N.S.) 88, 37-40 (1953). (Russian) #1

The author determines the velocity damping and field configuration of electromagnetic waves in a waveguide of arbitrary cross-section, the walls of which are good, but not perfect, conductors. His analysis is based on the successive expansion of the fields in powers of the complex wave resistance of the waveguide walls. This permits the application of Leontovich's boundary condition [Investigations into the Propagation of Radio Waves, Vol. 2, 1948 (in Russian)] and the consideration of only the interior region of the waveguide.

C. H. Papas (Pasadena, Calif.).

USSR/Engineering - Radio FD-3221

Card 1/1 Pub. 41-2/22

Author : Katsenelenbaum, B. Z., Moscow

Title : Degenerate modes in wave guides

Periodical : Izv. AN SSSR, Otd. Tekh. Nauk 7, 9-22, Jul 55

Abstract : Investigates disturbances produced by small sloping deformations of the boundaries of wave guides with finite conductivity. Establishes an equivalent boundary condition in the form of small slanting discontinuities in the path of magnetic currents along an undeformed surface. Applies usual methods of the theory of disturbances to the case of degenerate electromagnetic oscillations in wave guides. Concludes with investigation of certain questions on non-sloping local disturbances. Four graphs; formulae. Eighteen references, eight USSR.

Institution : Institute of Radio Engineering and Electronics, Academy of Sciences USSR

Submitted : 18 February 1955

KATSENELENBAUM, B.Z.

SHTEYNSHLEYGER, Vol'f Bentsionovich; LOKSHINA, T.A., redaktor; NEYMAN, M.S., professor, doktor tekhnicheskikh nauk, retsenzent; KATSENELENBAUM, B.Z., kandidat tekhnicheskikh nauk, retsenzent; ZUDAKIN, I.M., tekhnicheskiy redaktor

[Phenomena of interaction of waves in electromagnetic resonators] IAvleniia vzaimodeistviia voln v elektromagnitnykh rezonatorakh. Moskva, Gos.izd-vo obor.promysh., 1955. 111 p. (MLRA 9:2)

(Electric resonators)

USSR Physics - Wave guides

Authors : Katsenelenbaum, B. Z.

Title : Irregular wave-guides with slowly changing parameters

Periodical : Dok. AN SSSR 102/4, 711-714, Jun 1, 1955

is described. The method is based on the study of

KATSENETENBAUM, B.Z.

Category : USSR/Radiophysics - Radiation of Radio Waves. Antennas I-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4510

Author : Katsenetenbaum, B.Z.
Inst : Institute of Radio Engineering and Electronics, Academy of Sciences, USSR
Title : Bent Waveguides of Constant Cross Sections

Orig Pub : Radiotekhnika i elektronika, 1956, 1, No 2, 171-185

Abstract : Solution of the problem of the passage of an electromagnetic wave through a bent waveguide of any cross section. The walls of the waveguide are assumed perfectly conducting. The field in any section is represented as the superposition of waves that can propagate in a straight-line waveguide of the same section. The amplitudes of these waves depend on the angle of the cylindrical system of coordinates, the axis of which agrees with the axis of the bend in the given section. A first-order system of differential equations is established for these amplitudes; the amplitudes are continuous in the junction between sections that have different curvatures; this determines the values of these functions on the boundaries of the bent portion of the waveguide. The coefficients of the system of equations depend on the shape of the

Card : 1/2

Category : USSR/Radiophysics - Radiation of Radio Waves. Antennas I-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4510

transverse cross section, on the direction, and on the magnitude of the curvature. The system of equations describes the coupling produced by the curving of the waveguide between waves that are independent of each other in the straight waveguide. In the case of a bend having a short electric length (break) and of a bend having a large radius of curvature, the system is solved in quadratures, and explicit expressions are obtained for the amplitudes of all the waves. A detailed analysis is made of the case where a H_{01} wave in a round waveguide is incidnet on a section that is bent in a circular arc. A degeneracy occurs in this case, the E_{11} wave has the same velocity as the H_{01}, and therefore after passing through a finite angle it assumes finite values even if the radius of curvature is large. The method developed in the article leads to the known results by Jouguet (Jouguet, M., Cables et Transmission, 1947, 1, No 2, 133) for the same problem and to generalize these results in many respects. The losses due to the transformation of the H_{01} wave by a break of ϑ radians are calculated. The total relative losses of energy are equal approximately 16.6 $(ka\vartheta)^2 10^{-2}$) (k is the wave number in vacuum and a the radius of the waveguide). Approximately 3/5 of the energy is carried by the H_{12} mode while the H_{11} and E_{11} modes carry 1/5 each. Bibliography, 6 titles.

Card : 2/2

I-5

KATSENELENBAUM, B.Z.

Category : USSR/Radiophysics - Radiation of radio waves. Antennas

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1864

Author : Katsenelenbaum, B.Z.

Title : ~~Symmetric Dielectric~~ Transition in Round Waveguide for H_{01} Mode.

Orig Pub : Radiotekhn. i elektronika, 1956, 1, No 3, 339-343

Abstract : Explanation of an example of the application of the transverse-cross section method to the problem of the incidence of a H_{01} mode in a round waveguide on a long symmetrical dielectric transition. A general equation is established for the determination of the reflection coefficient of such a transition.

Card : 1/1

KATSENELENBAUM, B.Z.

109-5-3/22

AUTHOR: KATSENELENBAUM, B.Z.

TITLE: Long Symmetrical Waveguide Transition for the Wave H_{01}. (Dlinnyy simmetrichnyy volnovodnyy perekhod dlya volny H_{01}, Russian)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol 2, Nr 5, pp 531 - 546 (U.S.S.R.)

ABSTRACT: Two waveguides with circular cross section and common axis but with different radii, are connected with each other by a waveguide transition which is a body of rotation. The angle which is formed by the generatrix of the waveguide with the axis is a small quantity which has everywhere one and the same order of magnitude. The wave H_{01} impinges upon the non-regular waveguide. The amplitudes of the reflected wave and those of the parasitic H_{on}-type waves are determined here. From the mathematical point of view an ordinary homogeneous differential equation of second order and special type is investigated in the first case, namely in the determination of the coefficient of reflection of the impinging wave. For determining the amplitude of the parasitic wave H_{on}, a non-homogeneous equation is solved. The formulae derived here can also be applied to the case in which the wave number of one of the waves, which is calculated for a regular waveguide, becomes equal to zero

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109-5-3/22

Long Symmetrical Waveguide Transition for the Wave H_{01}.

in any cross section of the waveguide transition.
(With 1 table, 2 illustrations and 7 Slavic references)

ASSOCIARION: Institute for Radio Engineering and Electronics of the Academy of Science of the U.S.S.R. (Institut radiotekhniki i elektroniki AN SSSR, Russian)

PRESENTED BY:

SUBMITTED: 29.8.1956

AVAILABLE: Library of Congress

Card 2/2

KATSENELENBAUM, B. Z.

20-2-11/50

AUTHOR: Katsenelenbaum, B. Z.

TITLE: On the General Theory of Non-Regular Wave Guides (K obshchey teorii neregulyarnykh volnovodov)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 2, pp. 203 - 206 (USSR)

ABSTRACT: In a previous work (ref. 1) the author developed a method by which the problem of the propagation of radiowaves in a non-regular wave guide is reduced to a system of ordinary differential equations. Further previous works by the author dealing with this method are mentioned. In the present paper this method is applied to the problem of the symmetric electric wave in a symmetric wave transition with a circular cross section. Here a restriction assumed in a previous paper is omitted. In the case of cylindrical coordinates and a dependence with respect to time exp(i ω t) the Maxwell equations give the following relations for the field to be investigated (here the line denotes $\partial/\partial z$): $E_r = (1/ik)H'$, $E_z = (1/ik)(1/r)\partial(rH)/\partial r$; $k = \omega/c$. A formula is given also for the azimuthal component H(r,z) of the magnetic field. The cross sections of the wave guide through the planes z = const are circles with the radius a(z). Next, the functions $H_m(r,z)$ are introduced which at any z =

Card 1/2

20-2-11/50

On the General Theory of Non-Regular Wave Guides

const represent the magnetic field of the waves E_{om} in a regular wave guide with the radius a(z). The further course of computations isfollowed. In the general case the field are expressed by two potential functions. Next, the author discusses yet another method, which is not quite as rigorous, but very illustrative, with the help of which all most interesting properties of a non-homogeneous wave guide can be determined in an elementary manner. The expressions for the amplitudes of the parasitic electric waves in wave transition computed with the help of this method are given. There are 10 references, 7 of which are Slavic.

ASSOCIATION: Radiotechnical and Electronic Institute AN USSR (Institut radiotekhniki i elektroniki Akademii nauk SSSR)

PRESENTED: May 11, 1957, by B. A. Vvedenskiy, Academician

SUBMITTED: May 11, 1957.

AVAILABLE: Library of Congress

Card 2/2

KATSENELENBAUM, B. Z.

B. Z. KATSENELENBAUM, N. P. Kehzhentseva, V. V. Malin, A. N. Sivov: "Propagation of H_{01} waves in a periodic waveguide." Scientific Session Devoted to Radio Day, May 1958, Trudrezervizdat, Moscow, 9 Sep. 58

Conditions for the propagation of a summetric magnetic H_{01} wave in a rectilinear periodic waveguide and the transmission of an H_{01} wave through a bend in a periodic waveguide are investigated.

The periodicity, shape and size of the conductor from which the waveguide is wound, the finite conductivity of the metal, the dielectric shell of the waveguide are taken into account in computing the damping of the H_{01} wave.

The coupling coefficients of the H_{01} wave with the parasitic E and H_1 type waves which arise are found when analyzing the transmission of the H_{01} wave through the bend.

KATSENELENBAUM B. Z

109-1-4/18

AUTHOR: Katsenelenbaum, B.Z.

TITLE: Influence of the Dielectric Film on the Attenuation of the H_{01} Wave in a Straight, Nearly Circular Waveguide
(Vliyaniye dielektricheskoy plenki na zatukhaniye volny H_{01} v pryamolineynom volnovode, blizkom k krugovomu)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol.III, Nr 1, pp.38-45 (USSR)

ABSTRACT: A thin semi-conducting film deposited on the inner surface of a waveguide results in the attenuation of the waves propagated in the guide. For the waves of H_{0m} type, the attenuation is proportional to the cube of the film thickness, δ, and it is much lower than the attenuation for other waves, which is proportional to δ. If the walls of the waveguide are deformed or distorted, the field becomes distorted and a normal component of the electric field appears. This results in an additional attenuation of H_{0m} waves, which is proportional to δ. The attenuation increases with the degree of the deformation. The

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109-1-4/18

Influence of the Dielectric Film on the Attenuation of the H_{01} Wave in a Straight, Nearly Circular Waveguide

aim of this work is to determine the additional attenuation in slightly deformed wave guides, provided their axes are rectilinear. A circular waveguide, coated internally with a semi-conducting layer having a dielectric constant $\varepsilon = \varepsilon - i\varepsilon''$ is considered. It is assumed that in the presence of a normal electric field component, E_n, the attenuation coefficient of the system can be expressed by:

$$\beta = \frac{k\delta\varepsilon''}{|\varepsilon|^2} \frac{\oint |E_n|^2 \, ds}{\mathrm{Re}\int [EH^*]_z dS}, \qquad (1)$$

where $k = \omega/c$. The evaluation of the additional attenuation β of the H_{01} wave due to the deviation of the cross section of the waveguide from an ideal circle can be determined from the so-called diaphragm function, which can be evaluated by finding the eigen-function of the boundary equation given by Formula 7. From this, it is found that the contour integral of Eq.(6) is expressed by

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Eq.(20). Since the integral enters into the expression for the additional attenuation of the waveguide, as can be seen from Eq.(6), the solution of the integral can be used to determine the value of the attenuation. It is found that the additional attenuation is expressed by Eq.(27) where β_0 is given by Eq.(4). If the waveguide is subject to an elliptical deformation such that Δ represents the difference between the maximum and the minimum radii, the additional attenuation is expressed by:

$$\beta = 2\beta_0 \left(\frac{\Delta}{a} \right)^2 , \qquad (29)$$

where a is the radius of the waveguide. From the Eq.(29) it can be shown that, if it is necessary to restrict β to less than $10^{-3}\beta_0$, Δ should be smaller than $2.2 \times 10^{-2} a$. In this case, if $a = 25$ mm, the difference between the

Influence of the Dielectric Film on the Attenuation of the H_{01} Wave in a Straight, Nearly Circular Waveguide

semi-axes should not exceed 0.6 mm. The most important result of the above analysis is Eq.(27), which can be extended to the evaluation of the attenuation in waveguides with appreciable deformations, in particular, in the systems in which the cross section varies as a function of length. The paper contains 7 references, 3 of which are Russian and 4 English.

ASSOCIATION: The Institute of Radio Engineering and Electronics of the Soviet Academy of Sciences (Institut radiotekhniki i elektroniki, AN SSSR)

SUBMITTED: February 13, 1957

AVAILABLE: Library of Congress

KATSENELENBAUM, B.Z.

108-13-3-10/13

AUTHOR: None Given

TITLE: International Congress for High-Frequency Circuits and Antennae (Mezhdunarodnyy kongress po tsepyam i antennam sverkhvysokoy chastoty)

PERIODICAL: Radiotekhnika, 1958, Vol. 13, Nr 3, pp. 73 - 75 (USSR)

ABSTRACT: This are transactions of the congress which took place in Paris from October 21 - 26, 1957. It was organized by the French Society for Technical Engineering and Radio Engineering and was supported by the government, the trade unions and a number of companies. 166 lectures were held. In two commissions the members of the Soviet delegation Professor A. L. Mikaelyan and the Corresponding Member of the AS USSR A. A. Pistol'kors were elected chairmen. Of the Soviet delegates B. Z. Katsenelenbaum spoke on the theory of wave guides with slowly changing parameters, and Yu. I. Kaznacheyev on works and sucess in the theoretical field of telecommunication over great distances by means of the H_{01}-wave.

Card 1/2

AUTHOR: Katsenelenbaum, B.Z. 109-3-5-6/17

TITLE: Bent Waveguides with a Non-homogeneous Medium (Izognutyye volnovody s neodnorodnym zapolneniyem)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol III, Nr 5, pp 634 - 640 (USSR)

ABSTRACT: The work is a generalisation of the results obtained by the author in an earlier article (Ref.1). The solution is based on the concept (Ref.1) that the field in a bent waveguide can be represented as a super-position of the fields which exist in rectilinear waveguides; the coefficients of the super-position for this solution are expressed by a system of differential equations. The boundary conditions at the surface of the waveguide must be satisfied by each term of the super-position. First, a regular, rectilinear waveguide, filled with an arbitrary medium is considered. The fields at the walls of the guide should satisfy the conditions expressed by Eqs.(1) and (2), where s and z denote the directions tangent to the waveguide and:

$$w = \frac{1 + i}{2} kd,$$

where k is the wave number and d is the thickness of the surface layer. The waves propagating in the positive direction of the z- axis can be written in the form of Eq.(3), where

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721130003-4"

i is the wave index and h^i is the wave number. The components of the vectors $\vec{E}^i$ and $\vec{H}^i$ should satisfy Eqs.(5) which are derived from the Maxwell equations (Eqs.(4)). The fields propagating in the positive direction can be determined from Eq.(6), while the components of the two waves differing by the sign of the index are related by Eqs.(7). The fields $\vec{E}^i$, $\vec{H}^i$ can be expressed in terms of two diaphragm functions, as given by Eq.(8). The fields of different waves are mutually orthogonal so that the integral , taken over the transverse cross-section of the waveguide, is equal to zero. The fields in a bent waveguide (Ref.1) should fulfil the conditions expressed by Eqs.(10), where the functions $P_i(\theta)$ are determined by the system of Eqs.(14). The functions $P_i(\theta)$ can finally be expressed in the form of Eq.(17), in which $m^i = iF_{ii}$. The coefficients F and M are expressed by Eqs.(19) and (20), respectively, in which N^i is given by Eq.(21). The above analytical results are used to determine the fields in an empty waveguide and it is shown that they lead to the same final expressions (see Eqs.(29)) as those

obtained in the earlier work (Ref.1, Eq.(17)).
There are 1 figure and 8 references, 5 of which are Soviet, 2 English and 1 German.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio-Engineering and Electronics of the AS USSR)

SUBMITTED: February 13, 1957

AVAILABLE: Library of Congress

Card 3/3

1. Waveguides-Theory

SOV-109-3-6-3/27

AUTHORS: Katsenelenbaum, B. Z. and Malin, V. V.

TITLE: Formation of the Side Flow in a Long Waveguide Line: Part I (Formirovaniye poputnogo potoka v dlinnoy volnovodnoy linii, Ch.I)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 6, pp 750-755 (USSR)

ABSTRACT: The side flow in a waveguide is defined as the energy of the principal wave propagating in the main direction but lagging in time behind the principal wave. This phenomenon is caused by the presence of various irregularities in the waveguide which result in conversion losses and multiple reflections. The problem was first studied by Pierce and here his basic idea is extended in so far that a relationship is found between the geometrical parameters of the line and the side flow. For the purpose of analysis it is assumed that a_{1h} is the attenuation coefficient of the main wave in the guide, a_{ih} is the attenuation coefficient for a parasitic wave, a_{1i} is the coefficient of conversion of the principal wave into a parasitic wave. The reverse conversion coefficient, that is, the coefficient of conversion of a parasitic wave into the principal wave, is assumed to

be equal to a_{1i} . It is further assumed that the principal wave propagates in the direction of the axis z . By means of a simple analysis (see Fig.1), it is shown that the relative energy of the side flow at a distance z can be expressed by:

$$\left(\frac{m_i}{q_i}\right)^2 \left[2uq_i - 1 + e^{-2uq_i}\right] \qquad (5)$$

where m_i , q_i and u are defined by Eqs.(6). The parameter u in Eq.(5) denotes the length of the line in normalised units, the parameter m_i defines the type of the waveguide irregularity, while q_i is a parameter dependent on the attenuation coefficients of the principal and the parasitic waves. The side flow equation can also be derived more rigorously on the basis of Eqs.(7), where P_1 is the

Formation of the Side Flow in a Long Waveguide Line: Part I

energy of the principal wave, P_i is the energy of the parasitic wave and P_n relates to the side flow. Solution of Eq.(7) for the boundary conditions expressed by Eq.(8) is in the form of Eq.(9). From Eq.(9) it follows that Eq.(5) is accurate provided it fulfils the condition expressed by Eq.(10). The density distribution of the side flow can be expressed by Eq.(11), in which the variable $\xi = L/z$, where z is the length of the wave guide and L is the position of a cross-section; the function C in Eq.(11) is defined by Eq.(12). A graph of Eq.(11) is given in Fig.2. The distribution density of the partial side flow as a function of its time lag T_e is expressed by Eq.(17), where T_i is defined by Eq.(15); v_1 and v_i in Eq.(15) denote the group velocities of the principal and the parasitic waves, respectively. In certain cases, it is more convenient to employ a non-normalised expression for the partial side flow density distribution, which is in the form:

$$\tilde{\varphi}(\tau) = (2m_i u)^2 \frac{1}{T_i} \left(1 - \frac{\tau}{T_i}\right) e^{-2uq_i \frac{\tau}{T_i}} \qquad (18)$$

SOV-109-3-6-3/27

Formation of the Side Flow in a Long Waveguide Line: Part I

where the term $2m_i u = a_{1i} z$ denotes the conversion losses for the principal wave, and τ is expressed by Eq.(14). There are 2 figures and 1 English reference.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics of the Soviet Academy of Sciences)

SUBMITTED: November 21, 1956

Card 4/4

1. Waveguides - Performance 2. Waves - Propagation 3. Mathematics - Applications

SOV/109-3-7-4/23

AUTHOR: Katsenelenbaum, B. Z.

TITLE: Irregular Waveguides with Variable Dielectric Filling (Neregulyarnyye volnovody s peremennym dielektricheskim zapolneniyem)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 7, pp 890-895 (USSR)

ABSTRACT: The paper deals with the propagation of the electromagnetic waves in a waveguide which is obtained when a regular waveguide is filled with a material having a permittivity ε and a permeability μ which are functions of all the three coordinates. The analysis is based on the following: at a point x, y, z the fields $\vec{E}$ and $\vec{H}$ are assumed to consist of a set of waves which would exist in a regular waveguide where ε and μ are the same functions of the coordinates x and y in the transverse cross-section, as ε and μ in an irregular waveguide (for a given z = ζ). The coefficients of this set are functions of ζ and it is possible to determine for them a system of differential equations of the first order. In some cases it is

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possible to find an explicit solution of such a system. By employing conformal transformation, various cases dealing with local irregularities in a waveguide can also be considered as a problem of a waveguide with a non-uniform dielectric. It is assumed that the fields in a regular waveguide are in the form of:

$$\vec{E}(x, y, z) = \vec{E}^i(x, y) \exp(-ih^i z), \vec{H}(x, y, z) = \vec{H}^i(x, y) \exp(-ih^i z) \quad (1)$$

where the various components should fulfil the conditions imposed by Eqs.(2). The fields of Eqs.(1) can be determined from the Maxwell equations and they should satisfy the orthogonality condition as expressed by Eqs.(4), where the integrals are taken over the transverse cross-section. The transverse components of the field at an arbitrary cross-section $z = \zeta$ can be expressed in terms of the series given by Eqs.(5). This can also be written in the form of Eqs.(6). On the basis of Eqs.(6) and (3) it is possible to obtain a system of equations which describe the interaction of various types of waves in an irregular waveguide. This system is expressed by Eq.(8), where S_{ij} is the so-called coupling coefficient. The coefficients can be expressed by the integral of Eq.(9) or by Eqs.(10) and (11). Eq.(11) can also be represented in the form given by Eq.(12) or by Eq.(14), where S refers to the tangent component and n denotes the normal components. When $\varepsilon \to \infty$ the coupling coefficients can be expressed by Eq.(16). From the above it is concluded that a general expression for the coupling coefficients in a waveguide of variable cross-section can be obtained from the analysis of the electromagnetic field in a waveguide having a constant cross-section but filled with a non-uniform dielectric. The paper contains

SOV/109-3-7-4/23

Irregular Waveguides with Variable Dielectric Filling

13 references, 4 of which are English and 9 Soviet. 5 of the references relate to the works of the author.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics of the Soviet Academy of Sciences)

SUBMITTED: December 31, 1957.

1. Waveguides--Electrical properties 2. Electromagnetic waves --Propagation 3. Electric fields--Analysis 4. Magnetic fields --Analysis 5. Mathematics

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SOV/109-3-11-7/13

AUTHORS: Katsenelenbaum, B.Z. and Malin, V.V.

TITLE: Formation of the Side-flow in a Long Waveguide Line, Part 2 (Formirovaniye poputnogo potoka v dlinnoy volnovodnoy linii, Ch. 2.)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 11, pp 1389 - 1398 (USSR)

ABSTRACT: In an earlier work by the authors (this journal, 1958, Vol 3, Nr 6, p 750), an equation was derived for a coefficient m_i which determines the magnitude of the transformation losses in a waveguide and which plays a substantial part in the formation of the side flow. In the following, the coefficient is evaluated for several cases of waveguide discontinuities. It is assumed that the deformation of a waveguide, which does not involve the bending of the waveguide axis, can be described by an equation $r = a + l(z, \theta)$ where a is the radius of an ideal waveguide and l is the deformation (discontinuity) which varies at various points of the waveguide surface. If the waveguide is operating with an H_{01}-wave, the amplitudes of the prasitic

Card1/5 H-waves can be described by (Ref 3):

$$B_i^{\pm}(L) = \frac{-j\mu_o\mu_i}{a^2\sqrt{h_o h_i}} \frac{1}{\sqrt{1 - \frac{p^2}{\mu_i^2}}} \sqrt{\frac{\varepsilon_p}{2}} \int_0^L \sigma_p(z) e^{-js_i z} dz \qquad (3)$$

where it is assumed that the deformation extends over a distance $z = 0$ to $z = L$; i is the number of the parasitic wave, μ_i is the root of the derivative of the Bessel function (such that $2\pi a/\mu_i$ is the critical wavelength for a given type), h_i is the wave number for the H_{01}-wave . The coefficient $\sigma_p(z)$ in Eq (3) denotes either $a_p(z)$ or $b_p(z)$ from Eqs (2), depending on the polarisation of the wave. The quantity s_i is defined by Eq (4). Eq (3) can be written as Eq (8) in which the factor B_i is defined by Eq (7).

The energy of a parasitic wave can be expressed by a function P_i which is defined by Eq (5). On the basis of Eq (8), the energy carried by the parasitic waves caused by the waveguide junctions of the type illustrated in Figures 1, can be expressed by Eqs (9), (10) and (11). In a practical waveguide, the discontinuity parameters a_p vary as a function of distance and it is therefore necessary to evaluate the averages of the functions defined by Eqs (9), (10) and (11). The resulting expressions for the 3 cases illustrated in Figure 1 are given by Eqs (12) and (13). If the axis of the waveguide is curvilinear, the amplitudes of the parasitic waves can be expressed by Eqs (17), where R is the radius of curvature and B_i is the amplitude of a parasitic wave of the same type (H_{1i}) which is produced by curvature; B_i is calculated for 1 radian. The above formulae, as well as the formulae from the earlier work, were employed to investigate the sideflow in three particular cases. In the first case, it was assumed that a = 2.5 cm,

λ = 0.8 cm, the height of the discontinuity is δ = 0.005 cm and that the main wave is of the H_{01} type; the discontinuities are due to junctions; these are assumed to be symmetrical and spaced at a distance of 150 cm. The amplitudes of the parasitic H_{0i} waves for this case were evaluated by using Eq (7) and the results are shown in Table 2. The attenuation coefficients for these waves can be found from Eq (21); the results are given in Table 3. The additional parameters for the system are given in Table 4. The above numerical results were employed to construct a number of graphs; these are shown in Figures 3 and 4, where the curves of Figure 2 illustrate the distribution densities of the partial sideflows for various waves, while Figure 3 illustrates the overall distribution density for various lengths of the waveguide. In the second case, it is assumed that the sideflow is due to the displacement of the axes of the waveguide sections; again it is assumed that δ = 0.005 cm. The amplitudes of the parasitic waves for this case are shown in Tables 5 and 6, while the total sideflow as the function of the

SOV/109-3-11-7/13

Formation of the Side-flow in a Long Waveguide Line, Part 2

overall waveguide length is represented by Curve 2 in Figure 4. The third case refers to a waveguide having a bend with an angle equalling 0.1°. Various relevant parameters for this case are given in Table 7, while the total sideflow is illustrated by Curve 3 of Figure 4. There are 4 figures, 8 tables and 8 Soviet references.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics of the Ac.Sc.USSR)

SUBMITTED: November 21, 1956

Card 5/5

9(6),9(9)

AUTHOR: Katsenelenbaum, B. Z. SOV/20-123-1-13/56

TITLE: The Critical Cross Sections in Non-Regular Wave Guides (Kriticheskiye secheniya v neregulyarnykh volnovodakh)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 1, pp 53-56 (USSR)

ABSTRACT: In one of the author's previous papers (Ref 1) the amplitude of the wave H_{on} produced by the incidence of a wave H_{o1} on to a symmetric wave guide transition is calculated. In an arbitrary cross section of this transition the wave number h_n of the wave H_{on} becomes equal to zero. In this paper the same problem is solved for an arbitrary wave in a rectangular non-regular oblique wave guide of any shape with ideal walls. The electromagnetic field in an irregular wave guide is explicitly described in the case of a dependence with respect to time by the infinite system of equations

$$P_i' + ih^i P_i = \sum_{\nu=-\infty}^{\infty} S_{i\nu} P_\nu$$

(the prime denotes the derivation according to the coordinate

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The Critical Cross Sections in Non-Regular Wave Guides

SOV/20-123-1-13/56

z along the wave guide) and by the boundary conditions $z = 0$ and $z = L$ at the ends of the non-regular domain. These boundary conditions are determined by the nature of the wave inciding upon the aforementioned domain. $P_i(z)$ denotes the amplitudes of the waves of various types which may exist in a regular wave guide with a cross section equal to that of the non-regular wave guide. A general expression is written down for the coupling coefficients $S_{im}(z)$ and is specialized for electric and magnetic waves. Near the critical cross section the field cannot be represented as a sum of the fields of direct and inverse waves, and new critical variables must be introduced. Also equations of second order are written down for these variables. Also in the general case investigated here, the problem is reduced to the integration of the equation investigated in the aforementioned paper (Ref 1) for a special case. In the case $i = 1$ (i.e. if in the critical cross section the wave number of the inciding wave becomes equal to zero) the field is described by a homogeneous equation in the highest order with respect to ϑ_o. ϑ_o denotes a certain average

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cross section of $|\vartheta(s,z)|$, and $\vartheta(s,z)$ denotes the tang of the angle between the tangent to the wave guide (which is vertical to the edge of the cross section) and the z-axis. In the case $i \neq 1$ inhomogeneous equations given by the author are to be solved. For the system of differential equations it is possible to give a boundary condition (or more exactly expressed, a condition for the end of the wave guide), which is equivalent to the existence of a critical cross section: In this way the critical domain can be eliminated from the investigation. These "end conditions" are then explicitly written down for magnetic and electric waves. Outside the critical domain the direct and inverse waves form independently of one another. However, in the critical domain the parasitic field forms as a whole. The use of the "end condition" derived in the present paper permits a uniform analysis of the field in the entire non-regular wave guide.

The Critical Cross Sections in Non-Regular Wave Guides SOV/20-123-1-13/56

There are 8 references, 6 of which are Soviet.

ASSOCIATION: Institut radiotekhniki i elektroniki Akademii nauk SSSR (Institute for Radio Engineering and Electronics of the Academy of Sciences, USSR)

PRESENTED: June 20, 1958, by B. A. Vvedenskiy, Academician

SUBMITTED: June 17, 1958

Dukh

KATSENELENBAUM, B.Z., Doc Phys-Math Sci — (diss) "Theory of irregular wave guides with slowly changing parameters." Mos, Publishing House of the Acad of Sci USSR, 1959. 16 pp (Acad Sci USSR. Inst of Radio Engineering and Electronics). 175 copies. Bibliography at end of text (10 titles) (KL,38-59, 113)

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SHIRMAN, Yakov Davidovich; KATSENELENBAUM, B.Z., kand.tekhn.nauk, retsenzent; DOMBROVSKIY, I.A., kand.tekhn.nauk, retsenzent; PERSIKOV, M.V., kand.tekhn.nauk, otv.red.; NOVIKOVA, Ye.S., red.; KARABILOVA, S.F., tekhn.red.

[Radio wave guides and cavity resonators] Radiovolnovody i ob"emnye rezonatory. Moskva, Gos.izd-vo lit-ry po voprosam sviazi i radio, 1959. 378 p. (MIRA 12:4)

(Wave guides)

SOV/109- - -4-3-11/38

AUTHOR: B.Z. Katsenelenbaum

TITLE: Attenuation of H_{on}-waves in a Helical Waveguide (Zatukhaniye voln H_{on} v spiral'nom volnovode)

PERIODICAL: Radiotekhnika i Elektronika, 1959, Vol 4, Nr 3, pp 428-432 (USSR)

ABSTRACT: The following notation is adopted; the radius of the waveguide is a , the angle between the axis of the waveguide x and the wire of the helix is $\pi/2 - \psi$, the "period" of the helix is d and the wave number is $k = 2\pi/\lambda$. First, a ring-type of the waveguide is considered; in this case $\psi = o$. The expression for the attenuation due to the radiation losses is given by:

$$h'' = |\alpha|^2 \frac{\nu^2}{k^2 h_o a^4} \operatorname{Im} \left[\frac{\gamma a H_o^{(2)}(\gamma a)}{H_1^{(2)}(\gamma a)} \right],$$

$$\alpha = \frac{E_\vartheta}{H_x^o}, \quad \gamma^2 = k^2\varepsilon - h_o^2 , \tag{1}$$

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where ν is the root of the equation $J_1(\nu) = o$. E_ϑ is the electric field component while H_ϑ^o is the magnetic

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Attenuation of H_{on}-waves in a Helical Waveguide

field component. Eq (1) does not take into account the losses due to the dielectric. These additional losses can be expressed by Eq (5), where ε'' is the imaginary component of the permittivity of the dielectric material (which surrounds the wire of the waveguide). The attenuation losses due to the radiation in a helical waveguide ($\psi \neq 0$) are given by Eq (8).

There are 2 figures and 10 references, 7 of which are Soviet, 2 English and 1 German.

Card 2/2

ASSOCIATION: Institut Radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics of the Academy of Sciences of the USSR)

SUBMITTED: October 24, 1957

24385

S/142/60/003/005/012/015
E192/E382

9,1300

AUTHOR: Katsenelenbaum, B.Z.

TITLE: Reflection of the H_{10}-wave in a Rectangular Waveguide from a Thin Circular Metal Rod Which is Perpendicular to the Electric Field

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, 1960, Vol. 3, No. 5, pp. 517 - 518

TEXT: The above problem for a rod perpendicular to the narrow walls of the waveguide was solved in Ref. 1 (L. Levin - Modern Theory of Waveguides, izd.vo in. lit-ry, 1954) and Ref. 2 (Handbook of Waveguides, ed. Ya. Fel'd. Izd-vo Sovetskoye radio, 1952) and it was found that the reflection coefficient is given by:

$$R = -\frac{3i}{2} ah \frac{S}{S_o} \quad (1)$$

where S is the cross-section area of the rod,

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S_o = ab is the cross-section of the waveguide,
a is the width and
b the height of the waveguide,
h = 2π/λ is the wave number and
λ is the wavelength in the guide.

In the following an attempt is made to determine R for an arbitrary position of the rod provided it is parallel to the wider walls of the system. During the incidence of the H_{10}-wave onto the rod an azimuthal current component flows on its surface and this produces a reflected wave. The current is determined by the longitudinal component of the magnetic field H_z and this can be expressed by:

$$H_z = H_z^0 + 2\rho\left(\frac{\partial H_z^0}{\partial x}\cos\varphi + \frac{\partial H_z^0}{\partial y}\sin\varphi\right). \qquad (2)$$

where x and y are the rectangular coordinates in the

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S/142/60/003/005/012/015
E192/E382

Reflection of ...:

transverse cross-section of the rod, r and φ are the cylindrical coordinates and ρ is the radius of the rod. The reflected field produced by the azimuthal current proportional to H_z can be determined by the waveguide excitation theory. The reflection coefficient R is proportional to the integral of the magnetic field given by Eq. (2) over the surface area of the rod, the integral being multiplied by the azimuthal component of the electric field of the incident wave in the absence of the rod. Eq. (2) is valid for the rod provided its axis is perpendicular to the electric field E . The expression for the reflection coefficient is:

$$R = 3\pi^2 \frac{S}{S_0} \cos\vartheta \left(1 - e^{-2ihL}\right)\left(\frac{\operatorname{cosec}^2 2\vartheta}{L^2h^2 - \pi^2} - \frac{1}{12a^2h^2}\right). \quad (3)$$

where ϑ is the angle between the rod and the narrow walls of the waveguide,

L is the distance between the "inlet" and "outlet"

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24505

points of the rod in the waveguide, i.e.
$L = a \operatorname{ctg} \vartheta$.

For $\vartheta = \pi/2$, Eq. (3) is identical with Eq. (1).
There are 3 references: 2 Soviet and 1 non-Soviet. The English-language references quoted is: Ref. 3 - J. Lane - PIEE, 1955, B 102, No. 6, 819.

ASSOCIATION: Vsesoyuznyy NII fiziko-tekhnicheskikh i radiotekhnicheskikh izmereniy (All-Union Scientific Research Institute of Physicotechnical and Radiotechnical Measurements)

SUBMITTED: January 19, 1959 (to the editor of the journal NDVSh)
February 4, 1960 to this journal.

20411
S/109/60/005/012/009/035
E032/E514

9,9300

AUTHOR: Katsenelenbaum, B.Z.

TITLE: On the Normal Incidence of a Plane Electromagnetic Wave on a Periodic Separation Boundary of Two Dielectrics

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.12, pp.1929-1932

TEXT: The problem is formulated as follows. A plane electromagnetic wave is incident normally on the separation boundary between two dielectrics. The separation boundary is a "wavy" surface. The problem is to determine the amplitudes of reflected, transmitted and diffracted waves for any values of the wavelength and the height and period of the surface periodicity. The method put forward in the present paper is a generalization of the "cross section method", which was reported by the present author in Ref.1. The problem is reduced to determination of the proper waves in the so-called comparison medium whose properties are independent of one of the coordinates (corresponding to the direction of propagation of the wave) and are periodic in two other coordinates. In the final stage an infinite system of ordinary first order differential

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20411

S/109/60/005/012/009/035
E032/E514

On the Normal Incidence of a Plane Electromagnetic Wave on a Periodic Separation Boundary of Two Dielectrics

equations has to be solved. There are 1 figure and 6 references: 5 Soviet and 1 English.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics, AS USSR)

SUBMITTED: May 9, 1960

Card 2/2

S/108/60/015/05/08/008
B007/B014

AUTHOR: Katsenelenbaum, B. Z., Member of the Society

TITLE: Letter to the Editor. Wave Impedance of a Right-angled Waveguide

PERIODICAL: Radiotekhnika, 1960, Vol. 15, No. 5, p. 79

TEXT: According to many authors (Refs. 1-3) it is possible to use formula (1) for calculating the reflection coefficient R of the H_{10} wave of two right-angled waveguides which are joined together and whose cross sections differ but little from each other, if formula (2) is assumed for the wave impedance W. (1) and (2) lead to formula (3) (Ref. 3). It is pointed out that this formula is not exact, and that formula (4) is correct. It was published in the papers of Refs. 4 and 5, and is obtained from formula (1) by assuming (5). R may be determined from formula (6) especially in reflection from a waveguide with slowly changing cross-sectional areas. Finally, it is noted that on the basis of the paper of Ref. 6 it is possible to determine W for any waveguide of any cross section in such

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Letter to the Editor. Wave Impedance of a Right-angled Waveguide

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a way that both (6) and (1) are valid. There are 6 references: 5 Soviet and 1 German.

SUBMITTED: September 4, 1959

VB

Card 2/2

BK

PHASE I BOOK EXPLOITATION SOV/5876

Katsenelenbaum, Boris Zakharovich

Teoriya neregulyarnykh volnovodov s medlenno menyayushchimisya parametrami (Theroy of Nonuniform Waveguides With Slowly Changing Parameters) Moscow, Izd-vo AN SSSR, 1961. 215 p. Errata slip inserted. 2500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut radiotekhniki i elektroniki.

Resp. Ed.: V. I. Siforov, Corresponding Member, Academy of Sciences USSR: Ed. of Publishing House: V. V. Shmidt; Tech. Ed.: Yu. V. Rylina.

PURPOSE: The book is intended for scientific personnel, aspirants, and advanced students dealing with electrodynamic calculations and related problems in mathematical physics. It may also be used by specialists in waveguide communications.

Card 1/

Theory of Nonuniform Waveguides (Cont.) SOV/5876

COVERAGE: The book contains a systematic exposition of the calculation method for fields in nonuniform radio and acoustic waveguides. Bent and tapered waveguides and waveguides with filler material whose parameters vary along the axis of the guide are discussed. Attention is given to waveguides containing compensating and matching inserts. Large-radius waveguide bends, slight waveguide tapers, and gradual variation of material parameters are studied in detail. No personalities are mentioned. There are 114 references: 65 Soviet, 39 English, 5 French, and 5 German.

TABLE OF CONTENTS:

20576

9,1300 (also 1006,1130)

S/109/61/006/002/008/023
E140/E435

AUTHORS: Katsenelenbaum, B.Z. and Malina, Z.A.

TITLE: The Design of Tapers for the Symmetrical Magnetic Wave in a Circular Waveguide

PERIODICAL: Radiotekhnika i elektronika, 1961, Vol.6, No.2, pp.228-233

TEXT: The problem is to design waveguide tapers for transmission of the H_{01}-wave in circular waveguide with minimum conversion loss. The method used is based on the authors' previous results (Refs.1 and 3) (studied also by H.Unger, Ref.2). The treatment of critical sections is based on the authors' previous work (Ref.4). The method is based on the now well-known analogy applying to a certain approximation between the problem considered and that of finding the optimum form of variation of transmission line wave impedance for a matching section between two lines with differing wave impedances. The precision of the method depends on neglecting the difference between the wave length of the H_{01}- and H_{02}-waves in the waveguide and in free space. Under these conditions, the waveguide taper is calculated on the basis of optimal results known from transmission line theory. Two cases

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E140/E435

The Design of Tapers ...

are considered, one with the absence of critical sections, the other in their presence. The results obtained show that the approximation used is valid in the former case. To handle the latter case a more exact approximation, involving greater calculations, is given. This modification, being more general, is also applicable to the case of absence of critical sections but the results are not more satisfactory than the simplified method applicable to that case. There are 4 figures, 1 table and 8 references: 4 Soviet and 4 non-Soviet.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR
(Institute of Radioengineering and Electronics AS USSR)

SUBMITTED: June 24, 1960

Card 2/2

KATSENELENBAUM, B.Z.

Theory of irregular acoustic wave guides. Akust.zhur. 7 no.2:201-209 '61. (MIRA 14:7)

1. Institut radiotekhniki i elektroniki AN SSSR, Moskva.
(Sound--Transmission)

KATSENELENBAUM, B. Z.

"Diffraction on a broad aperture in broad wave-guide"

Paper to be presented on RADIO (SCIENTIFIC) UNION, INTERNATIONAL (URSI)- Symposium on Electromagnetic theory and Antennas - Copenhagen, Denmark, 25-30 Jun 62

1. Institute of Radio Engineering and Electronics, Academy of Sciences USSR

KATSENELENBAUM, B.Z. 6

V.A. FOK L.A. VAYNSHTEYN

a. VA Fock and LA Veinstein - 'Cross-Sectional Diffusion in Short-Wave Diffraction on Convex Cylinder.'

A.L. MIKHAELYAN

b. AL Michaelyian - 'Phenomenon of Interconnection of Magnetized Ferrite Patterns.'

c. BZ Katsenelenbaum - 'Diffraction on Wide Aperture in Wide-Wave Guide.'

d. YaA Monosov - 'On Theory of Parametric Resonance in Ferrites on UHF.'

GI Makarov - "The Propagation of Electromagnetic Waves in Smooth Ionospheric Layers."

reports to be submitted for the Intl. Symposium on Electromagnetic Theory and Antennas, Copenhagen, Denmark, June 1962.

S/019/62/000/008/026/121
A154/A126

9,1400

AUTHOR: Katsenelenbaum, B.Z.

TITLE: An image transmission line consisting of a mirror system

PERIODICAL: Byulleten' izobreteniy, no. 8, 1962, 30

TEXT: Class $21a^4$, 4868. No. 146362 (732170/26-9 of May 26, 1961). An image transmission line consisting of a mirror system differs from others in that, to reduce losses and to compensate for diffraction widening of the wave band, a planely-polarized wave is used directed at the mirrors at a small angle, the electrical vector of which is parallel to the surface of the mirrors. The latter are either of an almost plane or an almost cylindrical form, and have periodic surface discontinuities, e.g., corrugations.

B

Card 1/1

9.1300

S/020/62/144/002/012/028
B104/B102

AUTHOR: Katsenelenbaum, B. Z.

TITLE: Diffraction at a large aperture in a wide waveguide

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 322-324

TEXT: A solution u(x,z) of the wave equation $\nabla^2 u + k^2 u = 0$ is sought, which, for x = d (Fig. 1) and the lines in semi-planes x = 0, z < 0 and x = 0, z > L, satisfies the boundary condition u = 0 or $\partial u/\partial n = 0$. One of the possible waves, having a wavelength which is small compared with d, impinges from the left-hand side ($2\pi/k < d$, $kd \gg 1$, $kL \gg 1$). By the method presented here the field on the slit (x = 0, 0 < z < L) is sought first and the solution obtained is used to determine the field at the right-hand side of the slit. The field on the slit is calculated from formulas based on the Huygens principle and the solutions for the right-hand side of the slit are obtained by applying the perturbation theory to waveguides. The wave amplitudes in the right-hand part of the waveguide depend on the effect of all parts of the slit; hence the effects from the slit corners can be bypassed. The largest portion of the energy of the incident wave passes over to the right-hand part of the waveguide. With u = 0, the relative

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Diffraction at a large aperture in a ... S/020/62/144/002/012/028
B104/B102

energy decrease is $2\mu^3/3$, where $\mu = (\pi L/kd^2)^{1/2}$. Half of this energy passes out through the slit while the other half is transformed into parasitic waves. The energy loss is greater under the boundary condition $\partial u/\partial n = 0$. Expressions for the parasitic wave amplitudes are presented for both boundary conditions. The results here given are applicable to symmetric and magnetic waves in plane and circular waveguides. Moreover, they can be extended to asymptotic diffraction problems (optics) apart from wave guides. There is 1 figure.

ASSOCIATION: Institut radiotekhniki i elektroniki Akademii nauk SSSR (Institute of Radio Engineering and Electronics of the Academy of Sciences USSR)

PRESENTED: December 27, 1961, by B. A. Vvedenskiy, Academician

SUBMITTED: December 20, 1961

Card 2/3

Card 3/3

L 10370-63 EWT(1)/BDS--AFFTC/ASD/SSD--GG S/0109/63/008/006/1087/1088

ACCESSION NR: AP3001010 57

AUTHOR: Katsenelenbaum, B. Z.

TITLE: Seminar on quasi-optics [held at the Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics AN SSSR)]

SOURCE: Radiotekhnika i elektronika, v. 8, no. 6, 1963, 1087-1088

TOPIC TAGS: quasi-optics, waveguides

ABSTRACT: Quasi-optics deals mainly with centimeter- and millimeter-wave channeling by optical means. L. A. Vaynshteyn of the Institut fizicheskikh problem AN SSSR (Institute of Physical Problems AN SSSR) submitted a method for determining the natural frequency characteristics of a laser-type resonator by simple calculations made on a waveguide model. A new method for computing plane and axially symmetric horns and junction tubes between waveguides of various cross sections was described by its originator, B. Ye. Kinber of VNIIFTRI. Other reports dealt with the principles embodied in the Goubau beam waveguide and other channeling systems, a new type of interferometer, and an integrator for solving various diffraction problems by the use of Huygens approximations.

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L 18396-63 BDS/EEC-2 AFFTC/ASD/ESD-3/APGC Pi-4/Pj-4

ACCESSION NR: AP3003711 S/0109/63/008/007/1111/1119

65
64

AUTHOR: Katsenelenbaum, B. Z.

TITLE: Diffraction by a flat mirror at a wide-waveguide bend

25

SOURCE: Radiotekhnika i elektronika, v. 8, no. 7, 1963, 1111-1119

TOPIC TAGS: waveguide, diffraction

ABSTRACT: As wave propagation in wide waveguides obeys the laws intermediate between the waveguide-proper laws and the optical laws, electrodynamical calculation of diffraction by a mirror can be reduced to an asymptotic diffraction problem. A mathematical method used in the article combines the theory of diffraction in open systems with the theory of waveguides. The transformation loss or energy of undesirable modes is calculated for a flat waveguide (two polarizations of the incident wave) and for a H_{01} mode in a circular waveguide. In the latter case, the loss is $0{,}55\,(\lambda/a)^{3/2}\,(1/\sin\beta)^{1/2}$, where λ is the wavelength, a is the

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ACCESSION NR: AP3003711

waveguide radius $(a \gg \lambda)$, β is the angle between the waveguide sections. In the above method, first the field in the waveguide slots (equivalent to the bend with a mirror) is determined by essentially optical techniques. Then, conventional waveguide methods are applied to find the amplitudes of the dominant and undesirable modes outgoing from the bend. Orig. art. has: 5 figures and 18 formulas.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics, AN SSSR)

SUBMITTED: 28Jun62	DATE ACQ: 02Aug63	ENCL: 00
SUB CODE: CO	NO REF SOV: 002	OTHER: 003

Card 2/2

L 19697-63 BDS/EEC-2 AFFTC/ESD-3/RADC/APGC S/0109/63/008/009/1516/1522

ACCESSION NR: AP3006453

AUTHOR: Katsenelenbaum, B. Z.

TITLE: Transmission of millimeter waves by reflections from several focusing mirrors

SOURCE: Radiotekhnika i elektronika, v. 8, no. 9, 1963, 1516-1522

TOPIC TAGS: transmission, millimeter wave, focusing mirror, reflection, millimeter wave transmission

ABSTRACT: An approximate theory is offered for a transmission line that consists of a series of "confocal" mirrors; the mirrors are so arranged as if they were represented by spots on the internal surfaces of barrel-shaped solids of revolution; a series of such solids forming the transmission line. The series of mirrors can be considered as a phase-correcting system which provides a periodical correction for phase distribution in the wave thus preventing divergence of the beam in its propagation along the line. A millimeter-wave beam with an azimuthal component of electric field is propagated by consecutive reflection from one mirror to another. Near-grazing slip angles are used, and an attenuation of about a few

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ACCESSION NR: AP3006453

db/km is expected. The transmission-line performance is similar -- physically and mathematically -- to that of Fabry-Perot open resonators. Advantages and disadvantages of the new transmission line as compared to the conventional circular waveguide will become clear "after a clarification of the problem of necessary precision of manufacture and adjustment of the mirror system." Orig. art. has: 4 figures and 20 formulas.

ASSOCIATION: none

SUBMITTED: 06Aug62 DATE ACQ: 30Sep63 ENCL: 00

SUB CODE: CO NO REF SOV: 002 OTHER: 004

Card 2/2

KATSENELENBAUM, B.Z.; SIVOV, A.N.

Lamb's error in a problem on diffraction on a lattice from thin round rods. Radiotekh. i elektron. 9 no.2:360-361 F '64. (MIRA 17:3)

ASSOCIATION: None

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000721130003-4"

NR: AP4046689

... in turn, depends ... propagation constant for a monochromatic ... polarization of the electric field is ...

ACCESSION NR: AP4038550 S/0053/64/083/001/0081/0105

AUTHOR: Katsenelenbaum, B. Z.

TITLE: Quasioptical methods of formation and transmission of millimeter waves

SOURCE: Uspekhi fizicheskikh nauk, v. 83, no. 1, 1964, 81-105

TOPIC TAGS: waveguide bend, waveguide mirror, waveguide slot, millimeter wave, resonator, quasioptics, beam waveguide

ABSTRACT: The application of optical methods to radio-wave propagation is discussed as applied to three new technical problems in the propagation of millimeter and submillimeter wavelengths, where geometrical optics and wave theory overlap. These concern the use of optical devices (mirrors, prisms, lenses) in waveguides, the theory of open resonators such as are used in lasers, and lens-type or mirror-type lines for low-loss transmission of narrow radio beams. The first of these problems necessitates the unification of the mathematical methods used in optics and in waveguide theory. The second and third problems are mathematically similar and their distinguishing feature is that the ratio of the transverse beam dimension to the wavelength, which is large in ordinary optics, is not very large in quasioptics. The quasioptical systems considered are waveguide turns in which

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ACCESSION NR: AP4038550

the beam is bent by mirrors or by prisms, large slots in waveguides, microwave lens systems, mirror transmission lines, and open resonators. A section headed 'Confocal phase correctors' analyzes all the ray-bending devices from a unified point of view, since the net effect of all of them is to deflect the ray (correct the phase of the wave), with special attention paid to confocal systems. The relation between the concentration produced by the phase correctors and the losses in the system is discussed. Since quasioptics entails formally an asymptotic approach to diffraction problems, and since an asymptotic treatment of wave theory (Maxwell's equations) is very cumbersome, it is concluded that an asymptotic modification of ray optics should serve as the starting point in the developement of a finished theory of quasioptical devices. Orig. art. has: 12 figures and 54 formulas.

ASSOCIATION: None

SUBMITTED: 00 ATD PRESS: 3080 ENCL: 00

SUB CODE: OP, EC NR REF SOV: 025 OTHER: 028

Card 2/2

KATSENELENBAUM, B.Z.

Diffraction on flattened transparent bodies. Radiotekh. i elektron. 10 no.3:550-552 Mr '65. (MIRA 18:3)

L 8242-66
ACC NR: AP5022432 SOURCE CODE: UR/0109/65/010/009/1672/1675

AUTHOR: Vaganov, R. B.; Dogadkin, A. B.; Katsenelenbaum, B. Z.

ORG: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics, AN SSSR)

TITLE: Periscopic mirror line

SOURCE: Radiotekhnika i elektronika, v. 10, no. 9, 1965, 1672-1675

TOPIC TAGS: beam waveguide, periscopic waveguide

ABSTRACT: It is proven that the use of spherical-surface mirrors, desirable for practical reasons in mirror beam waveguides, instead of the theoretically optimal ellipsoid-surface mirrors, does not seriously impair the waveguide parameters. Two mirrors with a spacing small in comparison with their focal lengths are regarded as a single phase corrector, and the radiation loss therein is evaluated after A. Fox and T. Li (IEEE, 1961, 51, 1, 80). Based on this evaluation and on

UDC: 621.372.218:535.312

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L 8242-66
ACC NR: AP5022432

the G. Boyd and J. Gordon loss/beam-cross-section curves (BSTJ, 1963, 40, 2, 489), a method for designing periscopic mirror lines is indicated. The radius of mirror curvature and the diffraction loss can be calculated from the formulas given. Orig. art. has: 1 figure and 11 formulas.

SUB CODE: 09 / SUBM DATE: 06Jun64 / ORIG REF: 004 / OTH REF: 003

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L 14218-66 EWT(d)/EWT(1)/EEC(k)-2 IJP(c) GG/WH/WS-2
ACC NR: AP6003553 SOURCE CODE: UR/0109/66/011/001/0042/0050

AUTHOR: Gorshkova, N. K.; Dyachenko, A. A.; Zyatitskiy, V. A.; Katsenelenbaum, B. Z.; Kolesnikova, N. A.

40
B

ORG: none

TITLE: Principles of a statistical analysis of the propagation of a light beam in slightly deformed round mirror pipe

21,44,55

SOURCE: Radiotekhnika i elektronika, v. 11, no. 1, 1966, 42-50

TOPIC TAGS: light pipe, light propagation

ABSTRACT: Plots of per-unit-length loss vs. sliding angle for 5—80-cm diameter ideal aluminum pipes and light wavelengths of 0.6 and 3μ are constructed on the basis of theoretical formulas developed by C. Eaglesfield (Proc. IRE, p. B., 1962, 109, 43, 26). In considering rough-surface real pipes, the interaction of beam-parameter variations and the beam diffraction divergence caused by the finite wavelength-to-beam-section ratio are neglected. The real-pipe deformations are responsible for the increase in the average beam-sliding angle, for its divergence,

Card 1/2 UDC: 621.378.01

L 14218-66
ACC NR: AP6003553

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and for its deviation from the meridional plane ("helixing"). The latter phenomenon results in nonlinear increase of losses with the light-pipe length, in azimuth divergence of the beam, and (in the case of thin beams) in azimuth uncertainty of beam position. A statistical connection is established between (a) average squares of wall-deformation angles and (b) average values of the sliding angle, helixing, additional loss, and beam divergence. Orig. art. has: 6 figures, 16 formulas, and 1 table. [03]

SUB CODE: 20 / SUBM DATE: 18Sep64 / ORIG REF: 001 / OTH REF: 002/
ATD PRESS: 4194

TS
Card 2/2

DUBROVSKAYA, F.I.; DYUZHEVA, Yu.V.; KATSENELENBAUM, M.S.; YUSHKO, Ya.K.; KOROLEVA, V.A.; BULYCHEV, G.V.

Discharge into the atmosphere of wastes from the production of synthetic fatty acids and their effect on public health. Uch. zap. Mosk. nauch.-issl. inst. san. i gig. no.9:63-66 '61 (MIRA 16:11)

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KATSENELENBAUM, M.S. (Moskva)

Study of morbidity among workers on the basis of incapacity for work and the number of sick persons. Sov.zdrav. 14 no.5: 22-26 S-O '55. (MLRA 8:12)

1. Iz nauchno-issledovatel'skogo sanitarnogo instituta imeni Erismana.
(INDUSTRIAL HYGIENE
in Russia, morbidity among workers)
(VITAL STATISTICS,
morbidity of workers in Russia)

KATSENELENBAUM, M.S.

SOSNOVIK, I.Ya.; KATSENELENBAUM, M.S.; LUK'YANOV, V.S.; PLAKKHIN, A.S.; TOLKACHEVA, A.Ye.; CHUMAK, K.I.

Methods for organizing and carrying out complete dispensary services for workers. Zdrav.Ros.Feder. 1 no.11:31-35 N '57. (MIRA 10:12)
(MEDICINE, INDUSTRIAL)

BAYKOV, B.K.; MELKHINA, V.P.; Prinimali uchastiye: VASIL'YEV, A.S.; KATSENELENBAUM, M.S.; KOMAROVA, A.A.; ZHIGULINA, L.A.; TERNOVSKAYA, L.N.; YUSHKO, Ya.K.; CHUMAK, K.I.; GUSEL'NIKOVA, E.L.; KETOVA, O.N.

Hygienic characteristics of air pollution in Gubakha and its effect on health of the population. Uch. zap. Mosk. nauch.-issl. inst. san. i gig. no.6:21-25 '60. (MIRA 14:11)
(NIZHNYAYA GUBAKHA—AIR—POLLUTION)

DUBROVSKAYA, F.I.; KATSENELENBAUM, M.S.; YUSHKO, Ya.K.; BULYCHEV, G.V.; KOROLEVA, V.A.

Air pollution with wastes from synthetic fatty acids and alcohols and their effect on public health. Gig.i san. 26 no.12:3-8 D '61. (MIRA 15:9)

1. Iz Moskovskogo nauchno-issledovatel'skogo instituta gigiyeny imeni F.F.Erismana. (SHEBEKINO--AIR POLLUTION)

KATSENELENBAUM, N.A.

Superstructures in intermetallic compounds with densest packings of the atoms. Vestnik Moskov. Univ. 7, No.8, Ser. Fiz.-Mat. i Estestven. Nauk No.5, 181-6 '52. (MLRA 5:12)
(CA 47 no.22:11865 '53)

KATSENELENBAUM, N. D.

USSR/Physics - Crystallography

Apr 53

"Review of 'New Investigations in Crystallography and Crystallochemistry,'" (V. A. Frank-Kamenetskiy, reviewer)

Usp Fiz Nauk, Vol 49, No 4, pp 628-630

Reviewed book presents abridged translations of foreign articles processed by G. D. Vigdorovich, A. S. Anishkina, B. V. Nenart, T. L. Khotsyanova, V. M. Koshin, N. D. Katsenelenbaum, Yu. G. Zagalskiy, and N. A. Pobedimskaya, with preface by Prof. G. B. Bokiya the editor.

267T92

KATSENELENBAUM, N. L.

USSR/Geophysics - Crystallography Aug 52

"Super Structures in Intermetallic Compounds With Densest Packing of Atoms," N. L. Katsenelenbaum, Chair of Crystallography and Crystallochemistry

Vest Mos Univ, Ser Fizikomat i Yest Nauk, No 5, pp 181-186

Discusses structural types of binary alloys with densest packings of atoms and super structures. Establishes the following superstructure: Mg_3Cd (hexagonal packing of atoms), Cu_3Au, Al_3Ti, Al_3Zr,

275T68

Pt_3Cu, CuAu, CuPt, $CuPt_7$ (cubic packing of atoms) and Ni_3Ti (four layer packing of atoms).

1. KATSENELENBAUM, N. L.

2. USSR (600)

4. Stereochemistry

7. Super structures in intermetallic compounds with dense packing of atoms.
Vest. Mosk. un. 7 No. 8, 1952

9. Monthly Lists of Russian Accessions, Library of Congress, March 1953, Unclassified.

KATSENELENBAUM, Z., prof.

Turnover of checks and clearing payments in the U.S. Den. i kred. 16 no.4:77-87 Ap '58. (MIRA 11:5)
(United States--Banks and banking)