UTKIN, D.I., bul'dozerist

My experience with bulldozer work. Transp. stroi. 12 no.12: 4-5 D '62. (MIRA 16:1)

1. Mekhanizirovannaya kolonna No.59 Gosudarstvennogo tresta po mekhanizatsii stroitel'stva Glavspetsstroyputi Ministerstva transportnogo stroitel'stva SSSR.

(Bulldozers)

UTKIN, E.; CHEPURNOV, M.

Disseminate progressive accounting move widely. Bukhg. uchet. 14 [i. e. 16] no.12:20-25 D '57. (MIRA 11:1)
(Accounting)

LYAMIN, Yu.; UTKIN, E.

The financial work at an enterprise consists not only in compiling payment documents. Fin. SSSR 19 no.9:44-45 S '58. (MIRA 11:10)

1. Nachal'nik finansovogo otdela moskovskogo zavoda "Dinamo" (for Lyamin). 2. Aspirant Moskovskogo gosudarstvennogo ekonomicheskogo instituta (for Utkin).

(Finance)

LYAMIN, Yu.; UTKIN, E.

The seven-year plan of a factory. Fin. SSSR 19 no.12:70-73 D '58. (MIRA 11:12)

(Electric industries)

IYAMIN, Yu.; UTKIN, E.; SVERDLYUK, Sh.; AKOSTA, S.; BELOVA, A.; BALDYGA, N.; GOL'D, A.; ZVEZDINA, A.; PASECHNIK, N.; SHEYNGAUZ, S.

Revolving credit. Den.i kred. 17 no.4:52-61 Ap '59. (MIRA 12:8)

(Credit)

UTKIN, E.

For improving financial work standards in industry. Fin.SSSR 20 no.8:94-96 Ag '59. (MIRA 12:11)
(Finance)

UTKIN, E.

Improve the financial work in the national economy. Fin.SSSR 22 no.6:93-95 Je '61. (MIRA 14:6)

(Finance—Congresses)

KOLOSOV, A.; UTKIN, E.

Credit aids the increase of industrial productive capacity. Den. i kred. 20 no.12:17-22 D '62. (MIRA 16:1)

(Machinery industry—Finance)

UTK E.

On the problem of firms. Vop. ekon. no.10:27-37 0 '63.
(MIRA 16:12)

UTKIN, E.

Exercise more effort to maintain the standard of the Soviet trademark. Fin. SSSR 37 no.1:40-46 Ja '63. (MIRA 16:2)
(Moscow--Quality control)

UTKIN, Eduard Andreyevich; [illegible], I.G., red.

[State finance, currency circulation and credit in capitalist countries] Gosudarstvennye finansy, denezhnoe obrashchenie i kredit kapitalisticheskikh stran. Moskva, Univ. druzhby narodov, 1963. 122 p. (MIRA 17:[illegible])

UTKIN, Eduard Andreyevich, kand. ekon. nauk; KOGAN, Ye.L., red.;
RAKITIN, I.T., tekhn. red.

[Machines should work at full capacity] Rabotu mashin - na polnuiu moshchnost'. Moskva, Izd-vo "Znanie," 1964. 47 p. (Novoe v zhizni, nauke, tekhnike. III Seriia: Ekonomika, no.2)
(MIRA 17:2)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001858310002-3"

UTKIN, Eduard Andreyevich; PAK, G.V., red.; SELEZNEVA, A.D., mlad. red.

[Problems of planning in the developing countries] Problemy planirovaniia v razvivaiushchikhsia stranakh. Moskva, Ekonomika, 1965. 166 p. (MIRA 18:4)

UTKIN, F.I.

Our methods to work with a tightening device. Put' i put.khoz. 8 no.3:5 '64. (MIRA 17:3)

1. Starshiy putevoy rabochiy, stantsiya Miass I, Yuzhno-Ural'skoy dorogi.

87378

S/120/60/000/004/019/028
E032/E414

26.2190

AUTHORS: Sidorenko, V.V. and Utkin, G.A.

TITLE: Automatic Measurement of Counting Characteristics of Gas Discharge Counters

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No.4, pp.133-134

TEXT: The scheme suggested by the present authors is shown schematically in Fig.1. It includes the ПС-64 (PS-64) scaling unit 3 and the ЭПП-09 (EPP-09) pen recorder 4. Two additional stages, namely a pulse amplifier and a valve voltmeter (Fig 2) have been added to the PS-64 scaling unit. The pulse amplifier is based on the 6Н8С (6N8S) double triode. The second half of this double triode is operated as a cathode follower whose output is fed into an integrating circuit. The amplifier is connected to the limiting stage of the PS-64 scaling unit (shown to the left of the dotted line in Fig.2). The valve voltmeter is in the form of a balanced circuit, the "zero" being established by the 33 k ohm potentiometer. The signal entering the pen recorder is taken off the 51 ohm resistor on the extreme right of Fig.2. The voltage applied to the counter 1 is taken from the midpoint of the potentiometer 7 (Fig.1) connected to the high voltage

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E032/E414

Automatic Measurement of Counting Characteristics of Gas Discharge Counters

rectifier 9. The motion of the drum of the pen recorder is coupled to this potentiometer so that as the drum rotates, the voltage applied to the counter is uniformly increased. At the same time, the scaling unit accepts the pulses from the counter and the count rate is recorded by the pen recorder. There are 3 figures.

SUBMITTED: June 20, 1959

Card 2/2

UTKIN, G.I., kandidat meditsinskikh nauk.

Definition of the concepts "sepsis" and "suppurative intoxication." Vest.khir. 74 no.1:71-72 Ja-F '54. (MLRA 7 2)
(Toxins and antitoxins)

UTKIN, G.I., kandidat meditsinskikh nauk

[redacted] Tuberculosis of the vermiform appendix [with summary in French]. Probl.tub. 35 no.1:99-100 '57. (MIRA 10:6)

1. Iz khirurgicheskogo otdeleniya (nach. - kandidat meditsinskikh nauk G.I.Utkin) Portovoy bol'nitsy (nach. - kandidat meditsinskikh nauk K.R.Sedov) Kuybyshevgidrostroya.
(TUBERCULOSIS, GASTROINTESTINAL
appendix (Rus))

SEDOV, K.R., kand.med.nauk; UTKIN, G.I., kand.med.nauk; BEREZIN, I.M.

Characteristics of accidents in the construction of the Kuybyshev Hydroelectric Power Station. Ortop.travm. i protez. 20 no.3:60-61 Mr '59. (MIRA 12:6)

1. Iz khirurgicheskogo otdeleniya (nach. - kand.med.nauk G.I.Utkin) Portovoy bol'nitsy "Kuybyshevgidrostroya" (nach. - kand.med.nauk K.R.Sedov).

(ACCIDENTS, INDUSTRIAL

in construction of hydroelectric station (Rus))

SEDOV, K.R., kand.med.nauk; UTKIN, G.I., kand.med.nauk; BEREZIN, I.M.

Organization of medical and hygiene care at the construction site of Kuibyshev. Sov. zdrav. 19 no.3:29-30 '60. (MIRA 14:6)

1. Iz portovoy bol'nitsy "Kuybyshevgidrostroya" (nachal'nik - kandidat meditsinskikh nauk K.R.Sedov).
(VOLGA HYDROELECTRIC POWER STATIONS—HYGIENIC ASPECTS)

S/081/61/000/020/077/089
B106/B147

AUTHOR: Utkin, G. K.

TITLE: Production of furfurylidene acetone from the vapor condensates of hydrolyzate evaporation

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 322, abstract 20L54 (Gidrolizn. i leso-khim. prom-st', no. 4, 1960, 15-16)

TEXT: To reduce the losses in the concentration of aqueous solutions of furfurol (I), furfurylidene acetone (II) is produced by condensation of I with acetone in an alkaline medium using dilute solutions of I. After neutralizing the acid, acetone in a ratio of 1 mole to 1 mole of I and 5% by weight of 20% aqueous NaOH **are added to** 750 milliliters of a 0.3-5% aqueous solution of I. Condensation takes 8-20 hours. II is formed as a lower layer which is separated and slightly acidified with 50% H_2SO_4. The concentration of I in the initial solution influences the yield of II (data refer to concentration of I in %, yield of II in %): 0.3, 0; 1.8, 73.1; 3.47, 82.5; 5, 86.5. Since using $\geqslant$3.5% solutions of I yields the

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Production of furfurylidene ... S/081/61/000/020/077/089
B106/B147

best results, the content of I in less concentrated solutions is increased in a desorber 400 mm in diameter and consisting of 5 bubble-cap plates (4 bubble caps 50 mm in diameter each, 2 overflow pipes 45 mm in diameter each). The desorber operates at 0.25-0.35 atm pressure with a capacity of 5 kg/hr, and increases the concentration of I in an initially 0.3-0.6% solution to 1.2% in 30 minutes, to 5% in 2 hr, 12-14% of the condensate being lost with the waste liquid. The technical production system of II is given. [Abstracter's note: Complete translation.]

Card 2/2

[illegible], [illegible]

[illegible], [illegible] --"Self-Oscillating [illegible]." * (Dissertations for Degrees in Science [illegible] Institutions) [illegible] V. M. Molotov, Moscow, [illegible]

SO: Knizhnaya Letopis', No. 25, 18 Jun 55

* For Degree of Doctor of Technical Sciences

Category : USSR/Radiophysics - Generation and conversion of radio-frequency oscillations. I-4

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1830

Author : Utkin, G.M.
Title : New Method of Cont:oling the Frequency of Self-Excited Oscillators

Orig Pub : Elektrosvyaz', 1956, No 6, 36-38

Abstract : In the self-excited oscillator circuit proposed here the frequency is controlled by varying the bias voltage. This is accomplished by adding to the circuit a supplementary tank circuit tuned approximately tc a haromonic of the fundamental frequency and included in a positive-feedback loop. It is indicated that frequency deviations of approximately 5 - 1C% are obtainable in such systems. This is confirmed by experimental results.

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SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1597
AUTHOR UTKIN, G.M.
TITLE Self-Oscillation Systems with Two Degrees of Freedom and Divisible Frequencies.
PERIODICAL Radiotechnika, 11, fasc.10, 66-76 (1956)
Issued: 11 / 1956

The problems to be investigated are: 1.) The dependence of the generating frequencies in the synchronous zone on the parameters of the generator, and 2.) the question of the stability of these frequencies. The conclusions arrived at here disclose a number of possibilities for the application of such generators. Besides, it is possible, on the basis of these conclusions, to explain phenomena occurring in those systems in which the additional circuits with divisible frequencies are found to be parasitic.
First, a two-circuit autogenerator with backcoupling is investigated for approximated divided inherent frequencies, and an analysis is carried out in a general form on the basis of the slowly modifying complex amplitudes. A system of four equations is derived in which the right parts of the first three equations do not depend on the phase, so that investigation is confined to the analysis of the first three equations. Next, synchronous operation is examined, on which occasion it was found that the synchronous zone is proportional to the greater extinction, i.e. to the extinction of the "rough" circuit. The instability of the generating frequencies is caused by two factors: 1.) By the instability of the inherent frequency, and 2.) by the instability of the feed voltages. It is shown that with a great difference of extinction the instability

Radiotechnika, 11, fasc.10, 66-76 (1956) CARD 2 / 2 PA - 1597

of the generating frequencies is near the instability of the circuit with the lower extinction. The influence exercised by feed voltage on the generating frequencies is investigated and the stabilizing effect of the circuit with low extinction becomes apparent.
The instability of the oscillation frequencies is determined by the circuit with low extinction, i.e. by its stability and by the extent of extinction. This stabilizing effect can easily be represented physically. It is thus possible, if the difference in extinction is great, to divide the autogenerator to be investigated into two single-circuit autogenerators, of which the one with the favorable circuit synchronizes the other with the rough circuit.
With analysis in the general form it is not possible to form a clear conception of the operation of the autogenerator under investigation, but the results obtained on this occasion make it possible to become acquainted with the possibilities for the application of such systems, namely, for dividing or multiplying the quartz frequency (quartz being a favorable circuit) as well as for the realization of frequency modulation.

INSTITUTION:

109-2-1-7/17

AUTHOR: Utkin, G. M.

TITLE: Mutual Synchronization of Oscillators at Multiple Frequencies (Vzaimnaya sinkhronizatsiya avtogeneratorov na kratnykh chastotakh)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol 2, Nr 1, pp 44-56 (USSR)

ABSTRACT: Two coupled oscillators having approximately multiple frequencies are investigated mathematically. Mutual synchronization of oscillations can take place in such a two-oscillator system within a certain frequency-difference band. Determined is how the conditions and frequencies of oscillations and also the synchronization bandwidth depend on the frequency multiple and the oscillator parameters. Some peculiarities of beating conditions (out of the synchronization band) are examined. The problem of synchronization of an oscillator at its fundamental and multiple frequencies is usually examined in a simplified way, neglecting the reaction of the oscillator being synchronized on the master oscillator. Since in real physical systems such a reaction practically always takes place, an investigation of the mutual synchronization of two oscillators is of interest. Fundamental-frequency grid voltages are chosen as independent coordinates. A complete grid voltage includes the fundamental frequency component and the

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Mutual Synchronization of Oscillators at Multiple Frequencies

second oscillator frequency component (formulas 1 and 2). S. I. Yevtyanov's method (reference 2) is used for development of the truncated differential equations. As a result of a harmonic expansion of the anode current, mean trans-admittances are found (14). Synchronous conditions are mathematically considered (formulas 20 through 24), as are frequency-multiplication conditions (formulas 25 through 29), frequency-division conditions (formulas 30 through 37), and beating conditions (formulas 38 and 39). The synchronization band is given in formula (37). A two-tuned circuit oscillator (figure 2) was used to verify experimentally the above theoretical conclusions. Such an oscillator is equivalent to a system of two mutually-coupled single-circuit oscillators, provided they have identical tubes and the coupling between them is selected in such a way that the fundamental-frequency voltage of each oscillator is fully applied to the grid circuit of the other oscillator. The experiments have confirmed the principal theoretical inferences. Quantitative dependence of maximum synchronization bands on multiple frequencies under frequency-division and frequency-multiplication conditions agrees well with the theory. In the out-of-synchronization zone, simultaneous two-frequency oscillations existed with

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Mutual Synchronization of Oscillators at Multiple Frequencies

AM and FM near the synchronization band. The modulation frequency depends on the detuning of the oscillatory circuits and increases with the increase of detuning. As the detuning grows, in the case of sufficient regeneration of each circuit, the system passes smoothly from synchronous conditions at a given multiple into the beating conditions, then into synchronous conditions at another multiple, etc., from the multiple 20 through the multiple 2. The remarks of Professor S. I. Yevtyanov in reading the manuscript are acknowledged. There are 3 figures and 3 Soviet references in the article.

SUBMITTED: March 19, 1956

AVAILABLE: Library of Congress

1. Oscillators--Synchronization 2. Frequency--Applications
3. Oscillators--Mathematical analysis

Card 3/3

UTKIN, G.M.

265

AUTHORS: Korchagina, Ye. P. and Utkin, G.M.

TITLE: Thermal grid emission in metal-ceramic tubes. (Termoemissiya setki v metallokeramicheskikh lampakh).

PERIODICAL: "Elektrosvyaz'" (Telecommunications), 1957, No.4, April, pp. 12 - 21 (U.S.S.R.)

ABSTRACT: The authors give results of an experimental investigation of the thermal emission of the grid in metal-ceramic tubes. Results proved to be in good agreement with theoretical considerations. The thermal emission from the grid results in erroneous indications of measuring instruments in the anode circuit. The effective power and the efficiency decrease, while input power from the driving stage is increased, so that the overall gain of the stage is sharply reduced. These effects are due to the increase of the d.c. component of the anode and decrease of the d.c. component in the grid circuit. The thermal emission produces substantial distortions when anode modulation is used, this increase being due to additional pulses of the anode current which reduce the value of the fundamental. This distortion is increased by use of the automatic bias. For the types of tubes which were used in the experiment, i.e. GI-7B, GI-6B and GS-9B, the thermal emission occurs with instantaneous grid voltages $e_{g\ max} > 55V$,

which correspond to pulses of anode current $I_m > 1.1$ amp. This would tend to restrict the use of current characteristics of these tubes for practical applications. The experiment was carried out at low frequencies 16 Kc/s) so that the transit time could be disregarded. At UHF the transit time of electrons has to be taken into account and a supplementary experiment should be designed. The diagram of the experimental circuit is given. 2 theoretical and 3 experimental graphs are drawn, oscillograms of anode and grid current waveforms and of the distortion of the modulation envelopes by the thermal grid current emission are shown. There are 15 figures.

AUTHOR UTKIN G.M., Acting Member of the Association. PA - 3219

TITLE Simultaneous Oscillations of two Frequencies in an Autogenerator with Self-Shifting. (Odnovremennyye kolebaniya dvukh chastot v avtogeneratore s avtosmeshcheniyem.- Russian)

PERIODICAL Radiotekhnika 1957, Vol 12, Nr 4, pp 64-66 (USSR).
Received: 6/1957 Reviewed: 7/1956

ABSTRACT The paper under review investigates a generator which is analogous to the generator described by the same author in Radiotekhnika 1956, Nr 10, with self-shifting towards the line current being taken into consideration. With the low inertia of the self-shifting unit in autogenerators with two oscillatory circuits, there exists the possibility of stable oscillations of two frequencies, both of multiple and asynchronous frequencies. For purposes of verification the paper under review investigates the stability of the synchronous performance and the beating at a self-shifting, at low inertia, towards the line current. The experiment confirmed the conclusion with regard to the possibility of the existence of simultaneous

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PA - 3219

Simultaneous Oscillations of two Frequencies in an Autogenerator with Self-Shifting.

oscillations of two frequencies in an autogenerator with self-shifting, and this both for the synchronous zone and outside of it.
(2 reproductions, 3 Slavic references.)

ASSOCIATION: not given.
PRESENTED BY: -
SUBMITTED: 23.12. 1956.
AVAILABLE: Library of Congress.

CARD 2/2

UTKIN, G.M.

AUTHOR: Utkin, G. M., Regular member of the Society. 108-9-6/11

TITLE: Single Valve Scheme for the Reduction and the Multiplication of the Quartz Frequency (Odnolampovyye skhemy deleniye i umnozheniya chastoty kvartsa).

PERIODICAL: Radiotekhnika, 1957, Vol. 12, Nr 9, pp. 47-54 (USSR)

ABSTRACT: On the strength of results of investigations of the two-circuit autogenerators with integral frequencies carried out by the author (dissertation , May 1955; Radiotekhnika, 1956, Nr 10; Radiotekhnika, 1957, Nr 1) schemes for the practical application of such schemes for the reduction and multiplication of the quartz frequency are suggested here. It is shown that the equations for the here given autogenerators are analogous to those in the three above mentioned papers of the author. For this reason the final conclusions of these papers are exploited here. Expecially those on the dependence of the synchronous zone on the autogenerator-parameters and the integralness of the frequencies. It is shown that the schemes for the reduction and multiplication of quartz frequencies investigated here can be practically used up to a frequency of an order of magnitude of 15. The results of the experimental recheck of some of the suggested schemes are

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Single Valve Scheme for the Reduction and the Multiplication of the Quartz Frequency. 108-9-6/11

given. Finally it is pointed out that some of the here investigated schemes can also be used for the reduction of multiplication of the frequency of the exterior electromotive force. There are 8 figures and 6 Slavic references.

ASSOCIATION: Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi im. A. S. Popova

SUBMITTED: November 14, 1956 (initially), January 16, 1957 (after revision).

AVAILABLE: Library of Congress

Card 2/2

UTKIN, G.M.

108-11-4/10

AUTHORS: Korchagina, Ye. P., Utkin, G. M.

TITLE: On the Computation of Generators by Means of a Grounded Grid (O raschëte generatorov s zazemlënnoy setkoy).

PERIODICAL: Radiotekhnika, 1957, Vol. 12, Nr 11, pp. 29-38

ABSTRACT: In this place the question of selection of an optimum working of the frequency-amplifiers and the frequency-transformer according to the scheme with a grounded grid is examined. As given are assumed: efficiency at a load P_n, resonance-resistance R_{axx} of the anode-circuit and the tube-parameters. It is assumed that the anode-voltage E_a and the impulseheight of the anode-current I_n are not limited at the investigation. Later on criterions are introduced for the valuation of the usefulness of the recommended working. The anode-reaction is not taken under consideration here. The given efficiency at a load can be kept at different values of the amplitude of those harmonic vibrations of anode-current I_{an} for which the anode-circuit

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is tuned. The quantity I_{an} itself is determined by the impulse height I_n and the cut-off angle of the anode-current Θ. In this place the question of the influence of I_n and Θ upon the resulting degree of effect of the anode circuit and upon the coefficient of the cascade amplification according to the efficiency is examined. It is assumed, that the anode-voltage E_a at any current-value I_{an} is chosen in such a way that the critical working of the generator is guaranted. In order that the received results get a general character and can be applied for any tubes, the amplitude of the current I_{an} is characterized by the quantity of the degree of effect of the intermediate circuit η_k. It is demonstrated that at a limited quantity of the resonance-resistance in the circuit at amplifiers with grounded grids a cut-off angle of the anode-current of $\Theta = 90^o$ are recommended. A reduction of this angle reduces the coefficient of the cascade-amplification according to the efficiency and increases the total efficiency, which is used by the anode-circuits of the projected and of the antecedent cascade. At a given

On the Computation of Generators by Means of a Grounded Grid. 108-11-4/10

efficiency at a load the impulse height of the anode-current determines the circuit degree of effect and influences substantially the energy conditions in the anode-circuit. In the output cascades it is necessary in order to increase the general degree of effect of the transmitter to chose the impulse height of the anode-current according the minimum-efficiency used by two cascades. It is shown, that at the projecting of the intermediate cascades the fact that the same are loaded by the cathode circuit of the succeeding cascades (which form a nonlinear resistance) is to be taken into consideration. In order to multiply the frequency in the intermediate cascades of the transmitter the cut-off angle of the anode-current has to be chosen according to the conditions for the maximum cascade-amplification according to the efficiency. For the doubling of the frequency a $\Theta = 75^{\circ}$ and for the tripling of the same a $\Theta = 50^{\circ}$ has to be taken. The obtained diagrams show that a transition to a working with a minimum anode-voltage provokes an increase of the actual output and a reduction of the coefficient of the cascade-amplification according

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On the Computation of Generators by Means of a Grounded Grid. 108-11-4/10

to the efficiency. There are 14 figures, and 2 references, 2 of which are Slavic.

SUBMITTED: November 23, 1956.

AVAILABLE: Library of Congress

Card 4/4

UTKIN, G.M.

Investigating an oscillator having two circuits with 1:2 natural frequency correlation. Nauch.dokl.vys.shkoly; radiotekh. i elektron.no.1:119-123 '58. (MIRA 12:1)

1. Kafedra radioperedayushchikh ustroystv Moskovskogo energeticheskogo instituta.
(Oscillators, Electron-tube)

UTKIN, G.M.

Asynchronous oscillations in a two-circuit oscillator subjected to external influence. Nauch.dokl.vys.shkoly; radiotekh. i elektron.no.1:124-135 '58. (MIRA 12:1)

1. Kafedra radioperedayushchikh ustroystv Moskovskogo energeticheskogo instituta.
(Oscillators, Electron-tube)

UTKIN, G.M.

Frequency dividers with reactive feedback. Nauch.dokl.vys.shkoly; radiotekh. i elektron. no.2:151-161 '58. (MIRA 12:1)

1. Kafedra radioperedayushchikh ustroystv Moskovskogo energeticheskogo instituta.

(Frequency changers)

AUTHOR: Utkin, G.M. SOV/106-58-4-3/16

TITLE: Stabilisation of Frequency Over a Band by Use of a Generator of Combination Frequencies (Stabilizatsiya chastoty v diapazone s pomoshch'yu generatora kombinatsionnykh chastot)

PERIODICAL: Elektrosvyaz', 1958, Nr 4, pp 16 - 23 (USSR).

ABSTRACT: A system for producing very stable oscillations, tunable over a range of frequencies, is described. The system consists of two mixers, the output of each one of which is fed back to the input of the other via a resonant filter (tuned circuit) (Figure 1). When a voltage at a frequency ω_0 nearly equal to the sum of the resonant frequencies ω_1 and ω_2 of the filters is applied to the mixers from an external oscillator, then self-oscillations at two difference combination frequencies $\omega'' = \omega_0 - \omega'$ and $\omega' = \omega_0 - \omega''$ arise in the circuit, and the sum of these difference frequencies equals the frequency of the external oscillation voltage. By tuning the circuits in opposite directions, the generated frequencies can be smoothly changed over a range of frequencies. It is shown that, if the external frequency is stable, then the instability of the generated voltages is determined by the difference in the instabilities of the resonant frequencies of the individual

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filter circuits. If the filter circuits are identically constructed, then the instability of the generated frequencies will be very small. Equations are developed from which the amplitudes and frequencies of the generated voltages may be computed. The effect of supply voltage changes on the stability of the generated frequencies is also analysed. Figure 2 shows the circuit of such a generator, on the basis of which the theory is developed, but several possible variants are also discussed (Figures 3 - 8). The filter circuit voltages are taken as:

$$u_1 = U \cos \tau_1 , \quad u_2 = U_2 \cos \tau_2 \qquad (1)$$

where: $\tau_1 = \omega_1 t + \psi_1$, $\tau_2 = \omega_2 t + \psi_2$, $\omega_1 = 1/\sqrt{L_1 C_1}$, $\omega_2 = 1/\sqrt{L_2 C_2}$

and the external oscillator voltage $e = E \cos \omega_o t$ is conveniently written as:

$$e = E \cos (\tau_1 + \tau_2 + \varphi), \quad (2)$$

where:

$$\varphi = \Delta\omega t - (\psi_1 + \psi_2), \quad \Delta\omega = \omega_0 - (\omega_1 + \omega_2) \quad (3).$$

$U_2 \cos \tau_2$ and $E \cos(\tau_1 + \tau_2 + \varphi)$ act on the grid of the first mixer valve and its anode current contains harmonic and combination frequencies. The combination frequency with the argument $\tau_1 + \varphi$ will be in the pass band of the filter and will maintain oscillations in it. This voltage can be separated into two components in quadrature:

$$i_1 = I_{1a} \cos \tau_1 - I_{1p} \sin \tau_1; \quad i_2 = I_{2a} \cos \tau_2 - I_{2p} \sin \tau_2 \quad (4)$$

where:

$$I_{1a} = I_1(EU_2)\cos\varphi, \quad I_{1p} = -I_1(EU_2)\sin\varphi,$$
$$I_{2a} = I_2(EU_1)\cos\varphi, \quad I_{2p} = -I_2(EU_1)\sin\varphi.$$

Similar reasoning applies to the second mixer and the following can be deduced:

$$\left.\begin{aligned} T_1\dot{U}_1 &= I_{1a}R_1 - U_1 \\ T_1\dot{\Phi}_1U_1 &= I_{1p}R_1 \\ T_2\dot{U}_2 &= I_{2a}R_2 - U_2 \\ T_2\dot{\Phi}_2U_2 &= I_{2p}R_2 \end{aligned}\right\} \qquad (5)$$

where R_1, R_2, $T_1 = 2/\omega_1\delta_1$, $T_2 = 2/\omega_2\delta_2$ are the dynamic impedances and time constants of the circuits. Using Eqs.(5), (3) and $\dot{\varphi} = \Delta\omega - (\dot{\Phi}_1 + \dot{\Phi}_2)$, the following system is finally obtained:

$$\left.\begin{aligned} T_1\dot{U}_1 &= I_1R_1 \cos\varphi - U_1 \\ T_2\dot{U}_2 &= I_2R_2 \cos\varphi - U_2 \\ \dot{\varphi} &= \Delta\omega + \left(\frac{I_2R_2}{U_2T_2} + \frac{I_1R_1}{U_1T_1}\right)\sin\varphi \\ \dot{\varphi}_1 &= -\frac{I_1R_1}{U_1T_1}\sin\varphi \end{aligned}\right\} \qquad (6)$$

The author considers next a stationary regime, i.e. a regime in which the oscillation frequencies and amplitudes are constant and the system equations take the form :

Stabilisation of Frequency Over a Band by Use of a Generator of Combination Frequencies SOV/106-58-4-3/16

$$\left.\begin{aligned} I_1R_1 \cos\varphi &= U_1 \\ I_2R_2 \cos\varphi &= U_2 \\ \Delta\omega &= -\left(\frac{1}{T_1} + \frac{1}{T_2}\right)\operatorname{tg}\varphi \\ \dot{\varphi}_1 &= -\frac{1}{T_1}\operatorname{tg}\varphi \end{aligned}\right\} \qquad (7)$$

The phase difference φ for any re-tuning of the filter circuits can be found from the third equation. The first two equations determine the amplitudes of the oscillations and from the fourth can be found the generated frequencies by using the formulae:

$$\omega' = \omega_1 + \dot{\varphi}_1 , \quad \omega'' = \omega_0 - \omega' .$$

Card 6/7 The circuit conditions necessary for generation of stable oscillations are then deduced. The relationships between the instabilities of the individual filter frequencies and the instability of the generated frequencies is analysed. The results were checked experimentally, using circuits of Figures 2 and 3. The external generator frequency was 800 kc/s and the filter frequencies were 420 kc/s and 380 kc/s. When both capacitors were re-tuned in opposite directions, a smooth change over approximately 2 kc/s was obtained (Curve 1 of Figure 9). The instability was checked by re-tuning both capacitors in the same direction (Curves 2, 3 and 4). For Curve 2, the absolute changes in capacity were equal; for Curve 3, the relative changes in capacity were equal. There are 8 figures and 2 Soviet refs.

SUBMITTED: May 3, 1957

Card 7/7 1. Radio frequencies--Stabilization 2. Feedback oscillators--Applications 3. Radio frequency filters--Applications 4. Mathematics--Applications

UTKIN, G. M.

Я. И. Хургин

Ширина спектральных линий импульсных автоколебаний

В. А. [illegible]

О неустойчивых движениях в релятивистской гидродинамике и в магнитной гидродинамике

10 июня
(с 18 до 22 часов)

Г. М. Уткин

Полигармонические режимы в многоконтурных автоколебательных системах и генераторах повышенной стабильности частоты

Г. Ш. Кеванишвили

К теории устойчивости автоколебаний

М. Е. Герценштейн,
В. Е. [illegible]

Фазовые соотношения в одноконтурном параметрическом усилителе

В. П. [illegible]

О свободных колебаниях в колебательном контуре с емкостью p—n перехода

Г. Ш. Кеванишвили

О существовании предельного цикла в некоторых автоколебательных системах

11 июня
(с 10 до 15 часов)

А. М. [illegible]

Новые способы синхронной модуляции и синхронного детектирования

М. Е. Жаботинский,
Ю. Л. Свердлов

Многокаскадные умножители частоты

Ш. Д. [illegible]

Об одном способе построения [illegible] бифуркатора

В. А. [illegible]

О комбинационных приемах в преобразователях частоты

11 июня
(с 18 до 22 часов)

Report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June, 1959

66319

~~9 (2, 3)~~ 9.3260 SOV/162-59-1-17/27

AUTHOR: Utkin, G.M.

TITLE: The Synchronization, Division and Mu.tiplication of a Frequency With Increased Phase Stability

PERIODICAL: Nauchnyye doklady vysshey shkoly, Radiotekhnika i elektronika, 1959, Nr 1, pp 141-148

ABSTRACT: The author recommends using a combined frequency generator as a synchronizing generator providing an increased stability of the free oscillation frequency. For amplifying, dividing and multiplication of a frequency the synchronization of a self-oscillator to the basic or multiple frequency is frequently used. In this case, the self-oscillation frequency is equal to or multiple of the frequency of the external influence within the limits of a given range of detuning of the oscillator circuit (zone of synchronization). Within the synchronization zone, the instability of the self-oscillator circuit parameters does not have an influence on the frequency to be generated, but it leads to a phase in-

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The Synchronization, Division and Multiplication of a Frequency With Increased Phase Stability

stability of the oscillations to be synchronized in regard to the reference oscillations. The phase instability is undesireable and must be kept at a minimum in a number of cases. For providing a low phase instability with given values for the external e.m.f. and oscillation amplitude, a high stability of the free oscillations of a self-oscillator are required at a sufficiently small circuit time constant. The combined frequency generators suggested by the author [Ref 1, 2] will meet the aforementioned requirements. The author received for his invention Author's Certificate Nr 113971 on application Nr 571743, dated April 22, 1957. He discusses in this paper the equations of a self-contained combined frequency generator and its synchronization to one of the basic frequencies. The analysis shows that the synchronization effect with increased phase stability may be obtained not only on the basic frequency, but also on the multiple frequency, if the

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external e.m.f. is approximately a multiple of one of the self-oscillation frequencies. There are 1 block diagram, 2 circuit diagrams and 2 Russian references.

ASSOCIATION: Kafedra radioperedayushchikh ustroystv Moskovskogo energeticheskogo instituta (Chair of Radio Transmitters of the Moscow Power Engineering Institute)

SUBMITTED: November 10, 1958

Card 3/3

SOV/109-59-4-2-16/27

AUTHOR: Utkin, G.M.

TITLE: Synchronization of the Oscillators at Combination Frequencies for the Purpose of Wideband Frequency Stabilization (Sinkhronizatsiya avtogeneratorov na kombinatsionnykh chastotakh dlya tseley diapazonnoy stabilizatsii chastoty)

PERIODICAL: Radiotekhnika i Elektronika, 1959, Vol 4, Nr 2, pp 272-285 (USSR)

ABSTRACT: A system of three inductively coupled oscillators is considered (see Fig 1). The resonant circuits of two of the oscillators having frequencies ω_1 and ω_2 are tuned in such a way that the sum $\omega_1 + \omega_2$ is its multiple $(\omega_1 + \omega_2)$. p/q differs from the frequency ω_3 of the third oscillator by a small quantity $\Delta\omega$. Each of the circuits has a feedback with the corresponding grid circuit of its tube and is also inductively coupled to the grid circuits of the other two oscillators. The voltages across the resonant circuits can be written in the form of Eq (1), where U and ψ denote the amplitudes and the phases of the voltages. By adopting the notation defined by Eq (2), Eq (1) can be written in

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SOV/109-59-4-2-16/27

Synchronization of the Oscillators at Combination Frequencies for the Purpose of Wideband Frequency Stabilization

the form of Eq (3). The voltages at the grids of the oscillators can be written in the form of Eq (4), where k_{ij} denote the coupling coefficients between the anode and grid circuits of the oscillators. The anode current in an oscillator can be represented by Eq (8) or by Eq (9). On the basis of the above equations the anode currents at the three oscillators can be expressed by Eq (13) where the various components are defined by Eq (14). The simplified differential equations for the voltages and phases of the oscillators can, therefore, be written in the form of Eq (16) or as Eq (17). The above formulae are employed to analyse a system consisting of two inductively coupled oscillators in which two signals of the same frequency are applied to the grid circuits (see Fig 2). The simplified differential equations of the system can be written in the form of Eq (19). If in the system of Fig (1) $k_{13} = k_{23} = 0$, the system can be regarded as regenerative. In this case, the simplified differential equations are written in the form of Eq (25). The steady-state

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solution for this case is in the form of Eq (26), where the various parameters are defined by Eq (27). Eq (26) can also be written as Eq (28). In a general case of three oscillators, the steady-state solution of Eq (17) is in the form of Eq (30). From the above theoretical analysis it is concluded that the system described has two convenient characteristics. It is found that the asymmetry of the system, which determines the instability of the generated frequencies, can be corrected by a suitable choice of the damping factors for the resonant circuits. This type of correction can easily be realized over a comparatively wide range of frequencies. The second useful property of the system is that it can be realized by employing two tubes

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Synchronization of the Oscillators at Combination Frequencies for the Purpose of Wideband Frequency Stabilization

or even a single tube. There are 4 figures and 5 references of which 4 are Soviet and 1 English.

SUBMITTED: 21st June 1957

Card 4/4

28165

S/109/60/005/011/014/014
E074/E485

9,3260 (also 1067)

AUTHOR: [redacted]

TITLE: The Theory of Two-Circuit Parametric Converters and Oscillators

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.11, pp.1866-1875

TEXT: Parametric frequency conversion and oscillation in a circuit of the type shown in Fig.2 is examined. Such a circuit has a negative component of input conductance and is regenerative. It will give amplification if the resistive component of the input conductance is less than the circuit losses or, in the opposite case, self-excitation of the system will occur and oscillation will be initiated similar to oscillation in combination frequency oscillators. Considering the particular case of a reverse-biased semiconductor diode as the variable element and using a simple analysis, the following equations are obtained

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The Theory of Two-Circuit Parametric Converters and Oscillators

$$T_1\dot{U}_1 = S_1(U_1, U_2)\,U_2R_1\cos\varphi - U_1,$$
$$T_2\dot{U}_2 = S_2(U_1, U_2)\,U_1R_2\cos\varphi - U_2, \qquad (7)$$
$$\dot{\varphi} = \Delta\omega - \left(\frac{S_1(U_1, U_2)\,U_2R_1}{T_1U_1} + \frac{S_2(U_1, U_2)\,U_1R_2}{T_2U_2}\right)\sin\varphi,$$
$$\dot{\psi}_1 = \frac{S_1(U_1, U_2)\,U_2R_1}{T_1U_1}.$$

Eq. (7)

where $S_1 = (1/2)\omega_1\Delta C$, $S_2 = (1/2)\omega_2\Delta C$, T_1 and T_2 are the circuit time constants, R_1, R_2 the resonant resistances and φ the phase difference between i_1 and i_2 and U_1 and U_2 respectively. This expression has the same form for $\omega_0 = \omega_1 + \omega_2$ and $\omega_0 = \omega_1 - \omega_2$ where ω_0 is the pump frequency and agrees with the system of equations for a combination frequency oscillator, consisting of a closed circuit of two mixers and two filters as shown in Fig.3. The two-circuit parametric converter differs from

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this in that instead of two frequency converters, one is used which functions in both the forward and reverse direction so that both forward and reverse conversion can be accompanied by amplification. This ensures self-excitation of the combination frequency without additional sections. The chief properties of combination frequency oscillators relevant to this case are examined. The condition for self-excitation is given by

Eq. (8)

$$\frac{S_1 R_1 S_2 R_2}{1 + (\Delta\omega T)^2} > 1, \qquad (8)$$

This cannot be satisfied for $\omega_0 = \omega_1 - \omega_2$ since S_1 and S_2 then have different signs. Thus parametric oscillation can only occur for $\omega_0 = \omega_1 + \omega_2$. The condition for oscillation is thus given by

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Eq. 8'

$$\frac{0,25\,\frac{\Delta C}{C_1\delta_1}\,\frac{\Delta C}{C_2\delta_2}}{1+(\Delta\omega T)^2} > 1. \qquad (8')$$

where $\delta_1 = 2/\omega_1 T_1$ and $\delta_2 = 2/\omega_2 T_2$. A stationary system, in which the oscillation amplitudes are constant, is governed by the equation

Eq. (9)

$$\begin{aligned} &S_1(U_1, U_2)\,U_2 R_1 \cos\varphi = U_1, \\ &S_2(U_1, U_2)\,U_1 R_2 \cos\varphi = U_2, \\ &\Delta\omega = \left(\frac{1}{T_1} + \frac{1}{T_2}\right)\operatorname{tg}\varphi, \qquad \dot{\psi}_1 = \frac{1}{T_1}\operatorname{tg}\varphi. \end{aligned} \qquad (9)$$

and is stable if

Eq. a.

$$\frac{\partial S_1}{\partial U_1} < 0, \quad \frac{\partial S_1}{\partial U_2} < 0, \quad \frac{\partial S_2}{\partial U_1} < 0, \quad \frac{\partial S_2}{\partial U_2} < 0. \qquad a$$

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APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001858310002-3"

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which hold if $\Delta C(U_1,U_2)$ decreases uniformly with increase in oscillation amplitude. If these conditions are satisfied, maximum amplitude is obtained for ω_0 exactly equal to $\omega_1 + \omega_2$. The circuit also has the property that any frequency drift is self-compensated provided ω_0 is stable. This feature enables the system to be used for frequency stabilization. When not used as an oscillator, the two-circuit system can be used as an amplifier-frequency converter. The effect of external influences under these conditions are considered. The analysis of the system equations show that for external synchronization, the phase stability between an external signal and one of the oscillation frequencies is high. There are 4 figures and 7 references: 4 Soviet and 3 non-Soviet (one of which is translated into Russian).

SUBMITTED: October 24, 1959

Card 5/5

S/108/60/015/010/016/016/XX
B012/B077

9,4230

AUTHOR: Utkin, G. M., Member of the Society

TITLE: Stability of Polyharmonic Modes of Operation in Self-oscillating Multi-circuit Systems

PERIODICAL: Radiotekhnika, 1960, Vol. 15, No. 10, pp. 73-75

TEXT: This is an author's abstract which was presented on the Yubileynaya nauchnaya sessiya NTORiE im. A. S. Popova (Scientific Anniversary Session of NTORiE imeni A. S. Popov) in June 1959. As an addition to his work in "Radiotekhnika i elektronika", 1959, No. 12, the author presents an investigation of the stability of simultaneous oscillations in systems having many degrees of freedom (traveling-wave tube with feedback, back-wave tube, multi-circuit valve oscillator with self-excitation). The processes in such a system can be represented in most cases by a system of condensed differential equations of the following type:
$\dot{X}_i = A_i(X_1 \dots X_i \dots X_k \dots X_n)X_i$ (1); X_i is the amplitude of self-oscillations, and n is the number of degrees of freedom. It is shown that

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Stability of Polyharmonic Modes of Operation in Self-oscillating Multi-circuit Systems

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the conditions for the stability of a polyharmonic operation can be reduced to the following inequalities: $s_{ii} - s_{ik} < 0$, $s_{ii} + (n - 1)s_{ik} < 0$, with $s_{ii} = \partial A_i/\partial X_i$ and $s_{ik} = \partial A_i/\partial X_k$. From these inequalities it follows that: 1) if $s_{ik} > 0$, $s_{ii} < 0$, and $|s_{ii}| > (n - 1)\,|s_{ik}|$, then all simultaneous oscillations are stable; 2) if $s_{ik} = 0$, then the valve oscillator system is not coupled, and the condition for the stability of polyharmonic operation agrees with that for the stability of the oscillations in an autonomous oscillator ($s_{ii} < 0$); 3) if $s_{ik} < 0$, then $s_{ii} < 0$ and $|s_{ii}| > |s_{ik}|$ must hold for a stable polyharmonic operation. From these relations it follows that: the basic amplitude change has to influence the function A_i more than the change of the external amplitude; only then the simultaneous oscillations can be stable. Since the influence of the external amplitude depends on the coupling of the oscillators, a simultaneous oscillating is possible if the coupling is reduced (without changing the feedback of the basic oscillations). A multi-circuit

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Stability of Polyharmonic Modes of Operation in Self-oscillating Multi-circuit Systems

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B012/B077

valve oscillator with one tube cannot be regulated that way. In such valve oscillators which are self-excited, the possibility of simultaneous oscillations is determined from the characteristics of the plate current (if the self-oscillation increases, a nonlinearity of the plate-current characteristics appears and leads to a mutual influence of the oscillations). There are 3 figures.

SUBMITTED: December 31, 1958 (article)
July 2, 1959 (author's abstract)

Card 3/3

S/194/62/000/001/040/066
D201/D305

AUTHOR: Utkin, G. M.

TITLE: On the theory of frequency divider with reactive feedback

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no.1,1962,4, abstract 1Zh32 (Tr. Mosk. energ. in-ta, 1961, no. 34, 161-171)

TEXT: A theoretical investigation of the characteristics of a frequency divider with reactive feedback (RZh Fiz, 1959, no. 8, 18536), with polygon approximation of the anode current characteristic and with self-bias. Free oscillations are shown to occur within the interval between the resonant circuit frequency and the frequency of external driving force

$$2\Omega = (\Delta\omega_{max} - \Delta\omega_{min}) = 2/T\sqrt{A_0^2 - 1}$$

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On the theory of ...

S/194/62/000/001/040/066
D201/D305

where $A_0 = SR/\pi$, S - the slope of the static anode current characteristic, R - the product of the dynamic resistance of the circuit and of the modulus of the reactive feedback coefficient, T - time constant. For reliable synchronous frequency division the amplitude of the external driving force should be greater than the voltage of the shift of the anode current characteristic and A_0 = 2-5. The theoretical results were confirmed by an experiment in which the value 6Ж4 (6Zh4) was used. [Abstracter's note: Complete translation.]

Card 2/2

S/194/62/000/002/086/096
D271/D301

9.2580

AUTHORS: Aleksandrov, Yu. S. and Utkin, G. M.

TITLE: An oscillator circuit with improved frequency stability

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 2, 1962, abstract 2-7-160a (Tr. Mosk. energ. in-ta, 1961, no. 34, 172-180)

TEXT: A variable oscillator with improved frequency stability is studied; a polygonal approximation of the anode current characteristic is assumed and grid self-bias is taken into account. Stability is improved by a compensating effect of two identically built circuits. 5 references. [Abstracter's note: Complete translation.]

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Card 1/1

S/194/62/000/002/087/096
D271/D301

9,2580

AUTHOR: Utkin, G. M.

TITLE: Two-tube variable oscillator with improved frequency stability

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 2, 1962, abstract 2-7-160d (Tr. Mosk. energ. in-ta, 1961, no. 34, 181-191)

TEXT: Results are reported of a study of a two-tube, three-circuit oscillator; out of the three generated frequencies, two have an improved frequency stability, within range. In comparison with the previously considered systems, the above oscillator does not necessitate the use of a separate calibrating oscillator. The study was based on polygonal approximation of the anode current characteristic, and grid self-biassing effect was taken into account. 6 references. /Abstracter's note: Complete translation./

Card 1/1

37466

S/109/62/007/003/011/029
D266/D302

9,4220 (3304, 1052)

AUTHORS: Utkin, G.M., and Khryunov, A.V.

TITLE: Frequency stabilization of the reflex klystron with the aid of an auxiliary resonator

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 3, 1962, 448 - 459

TEXT: The purpose of the paper is to study the effect of a high-Q auxiliary resonator on the frequency stability, output power and bandwidth of a reflex klystron. Two versions are considered: 1) Output power taken from basic resonator; 2) Output power taken from auxiliary resonator. Assuming that the coupling between the resonators is lossless, the external load is matched and the transit angle of the electrons is independent of frequency (depending only on the respective voltages on the resonator and repeller) and using the equivalent circuit of the resonator, the circuit equations are solved and the conditions satisfying Hurwitz's stability criteria are found. The results are obtained as functions of the parameters

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$$\frac{Q_{1x}}{Q_{2x}}, \quad B_o = 0.63\ \tau_o \frac{R_{1x}}{R_g}, \quad A_o = \frac{X_c^2}{r_{1x}\ r_{2x}}, \quad \eta_{k1} = 1 - \frac{Q_{11}}{Q_{1x}},$$

$$\eta_{k2} = 1 - \frac{Q_{21}}{Q_{2x}},$$

where R_{1x} - resonant impedance of the first circuit, R_g - resistance of oscillator to d.c., x_c - coupling reactance between the resonators, r_1, r_2 - resistance of the respective circuits in series representation, Q_{1x}, Q_{2x} - quality of the circuits, Q_{11}, Q_{21} - quality of the loaded circuits. The index x refers to conditions in the absence of loading. The conclusions are as follows: Increase of B_O improves bandwidth and stability and increases the output power. Increased coupling of the load reduces bandwidth and stability. From the point of output power an optimum coupling exists. Increasing A_o the bandwidth increases, but output power is hardly affected.

Frequency stabilization of the ... S/109/62/007/003/011/029
D266/D302

Too large A_0 reduces stability; therefore the choice of A_0 requires a compromise between bandwidth and stability. Increasing Q_{2x}/Q_{1x} leads to wider bandwidth, improved stability and larger output power. It is concluded furthermore that the first version is superior to the second one in every respect. Measurements on the S band confirmed the theoretical results. There are 10 figures, 1 table and 6 Soviet-bloc references.

SUBMITTED: June 15, 1961

Card 3/3

L 59193-65
ACCESSION NR: AR5017549 UR/0058/65/000/006/H003/H004

SOURCE: Ref. zh. Fizika, Abs. 6Zh21

AUTHOR: Utkin, G. M.

TITLE: Symbolic and abbreviated equations for nonlinear wave systems with distributed parameters

CITED SOURCE: Sb. dokl. Tashkentsk. politekhn. in-t, no. 6, 1964, 93-101

TOPIC TAGS: nonlinear wave system, distributed system, symbolic equation, abbreviated equation, wave propagation

TRANSLATION: The author investigated theoretically wave processes in systems with distributive amplification, described by the equation

$$\frac{d^2u}{dx^2} - \varkappa^2 u = vI_b.$$

Here u -- complex amplitude of the line voltage and I_b -- complex amplitude of the external-signal current distributed along the line. By replacing the variables with their transforms and the differentiation operation by multiplication by the operator $j\beta$ the author obtains the operator equation $U = I_b Z(j\beta)$, in which $Z(j\beta) = v/[(j\beta)^2 - \varkappa^2] = R/(1 + j\xi)$; $\xi = Q(\beta/\beta_0 - \beta_0/\beta)$. From the known current function I_b the author obtains with the aid of this operator equation the transform of the

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ACCESSION NR: AR5017549

line voltage, and then, after taking the inverse Fourier transform, also the sought dependences of the complex amplitude of the voltage on the line. It is indicated that the presence of wave selectivity (dispersion) makes it possible to use, for the analysis of the processes in the line, abbreviated differential equations in the form

$$X_k \frac{dU_k}{dx} = I_{Bk} R_k - U_k,$$

where

$$R_k = \frac{P'_\delta (j\beta_k, 0)}{Q' (j\beta_k, 0)}; \quad X_k = \frac{Q'_\beta (j\beta_k, 0)}{Q'_\delta (j\beta_k, 0)\,\delta},$$

where P and Q are polynomials whose ratio determines the quantity $Z(j\beta)$ and δ is a small parameter introduced to emphasize the selective properties of the wave systems. U_k and I_{BK} are running complex amplitudes characterizing the amplitude and the phase of waves in a real system relative to the reference wave of a conservative system. By way of an example, the author considers also a nonlinear wave system, namely a traveling-wave amplifier with a line containing an active nonlinear element at each point. The corresponding abbreviated equation is of the form

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L 59193-65

ACCESSION NR: AR5017549

$$x\frac{dU}{dx}=I(U)R-U,$$

where I(U) depends on the type of nonlinearity. L. Subbotin.

SUB CODE: EC, MA ENCL: 00

Card 3/3

L 19027-65 EWT(d)/EWT(1)/EEC(b)-2/EWA(h) Pn-4/Pi-4/Pj-4/Pac-4/Pab RAEM(a)

ACCESSION NR: AP5000458 S/0109/64/009/012/2166/2173

AUTHOR: Utkin, G. M.

TITLE: Two-circuit semiconductor-diode parametric oscillator [Report at the Moscow Power-Engineering Institute, 1960]

SOURCE: Radiotekhnika i elektronika, v. 9, no. 12, 1964, 2166-2173

TOPIC TAGS: parametric oscillator, semiconductor diode oscillator

ABSTRACT: A two-circuit parametrically-excited oscillator is theoretically investigated, assuming an exponential characteristic of the diode nonlinear capacitance. An allowance is made for the self-bias due to momentary positive pulses in the diode. Formulas are developed for amplitudes and frequencies in terms of parameters, the pumping frequency being approximately equal to the sum of natural frequencies of the circuits. Mutual compensation of the circuit instabilities results in a higher frequency stability of the oscillator. The

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oscillator may be used for wideband frequency stabilization, for carrier stabilization in FM and PM systems, and also as a synchronized or AFC oscillator. Corroborating experiments included D-808—813 diodes operating at 900 and 1,200 kc in the two circuits with a Q-factor of 124 and 114, respectively. Orig. art. has: 3 figures and 30 formulas.

ASSOCIATION: none

SUBMITTED: 03Jul63 ENCL: 00

SUB CODE: EC NO REF SOV: 008 OTHER: 000

Card 2/2

L 10534-66 EWT(d) IJP(c)

ACC NR: AR5018767 SOURCE CODE: UR/0274/65/000/007/A013/A013

SOURCE: Ref. zh. Radiotekhnika i elektrosvyaz'. Svodnyy tom, Abs. 7A89 49

AUTHOR: Utkin, G. M. 55 44

B

TITLE: Symbolic and truncated equations of nonlinear wave systems with distributed parameters

CITED SOURCE: Sb. dokl. Tashkentsk. politekhn. in-t, no. 6, 1964, 93-101 4455

TOPIC TAGS: wave equation, distributed parameter system, traveling wave amplifier, operator equation, differential equation, Fourier transform, parameter

TRANSLATION: A wave-process problem in a system with distributed amplification can be reduced to the analysis of this equation: $\frac{d^2u}{dx^2} - x^2u = vI_b$. Here, u is the complex amplitude of line voltage, and I_b is the complex amplitude of the external action current distributed along the line according to some law. By replacing the variables with their images and differentiation, with multiplication by an operator $j\beta$, this operator equation is obtained: $U = I_b Z(j\beta)$, in which $(j\beta) - \frac{v}{(j\beta)^2 - x^2} - \frac{R}{1+j\zeta}$;

16,44,55

Card 1/2

UDC: 621.372.061.3

2

L 10534-66
ACC NR: AR5018767

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$\zeta = Q\left(\frac{\beta}{\beta_0} - \frac{\beta_0}{\beta}\right)$. This operator equation permits finding the line voltage from the known function of I_k, and then (by a reverse Fourier transform), the complex amplitude of the line voltage. It is stated that the wave selectivity permits using truncated differential equations of this form: $X_k = \frac{dU_k}{dx} = I_{bk}R_k - U_k$, where $R_k = \frac{P'_\delta(j\beta_k, 0)}{Q'(j\beta_k, 0)}$; $X_k = \frac{Q'_\beta(j\beta_k, 0)}{Q'_\delta(j\beta_k, 0)\,\delta}$; P and Q are the polynomials whose ratio determines $Z(i\beta)$; δ is a small parameter introduced for emphasizing the selective characteristics of the wave systems; U_k and I_{ik} are the traveling complex amplitudes which characterize the amplitude and phase of the waves in a real system with respect to the reference wave of a conservative system. As an example, a nonlinear wave system — a TW-wave amplifier on a line containing an active nonlinear element at each point — is considered. Bib 4.

SUB CODE: 17, 12

Card 2/2

L 35907-66 EWT(1)

ACC NR: AP6010787 SOURCE CODE: UR/0106/66/000/002/0023/0030

AUTHOR: Belov, L. A.; Blagoveshchenskiy, M. V.; Ivanov, V. A.; Kapranov, M. V.; Utkin, G. M.; Khryunov, A. V.

ORG: none

TITLE: Automatic phase control in reflex-type amplifiers

SOURCE: Elektrosvyaz', no. 2, 1966, 23-30

TOPIC TAGS: SHF amplifier, reflex klystron, electronic amplifier

ABSTRACT: An automatic phase control (APC) is suggested for widening the band and stabilizing the operation of reflex-type SHF amplifiers. A phase detector compares the input- and output-signal phases, and the error signal is used to control the phase shift; this can be done, for example, by controlling the repeller voltage. The article theoretically investigates the effect of signal-frequency

UDC: 621.375.9:621.3.072.7

Card 1/2

L 35907-66

ACC NR: AP6010787

deviation and APC-circuit parameters on the amplitude and phase in the reflex amplifier; also, the filtering characteristics of such an amplifier are explored. Equations describing the resonance curve and phase characteristic of an APC amplifier are set up; the introduction of APC considerably widens the amplification area. Curves are given for selecting the APC parameter to ensure specified noise filtration. An experimental verification with a reflex klystron permitted widening a 3-Mc amplifier band to 32 Mc (at 3000 Mc; gain, 25 db). Orig. art. has: 7 figures and 15 formulas.

SUB CODE: 09 / SUBM DATE: 05Jan65 / ORIG REF: 004 / OTH REF: 002

Card 2/2

L 03620-67 EWT(1)

ACC NR: AP6019012 SOURCE CODE: UR/0106/66/000/006/0044/0052

AUTHOR: Belov, L. A.; Blagoveshchenskiy, M. V.; Ivanov, V. A.; Kapranov, M. V.; Utkin, G. M.; Khryunov, A. V.

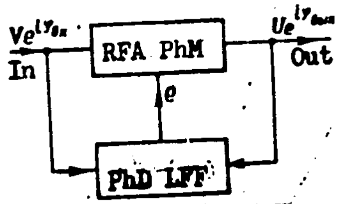
ORG: none

TITLE: Automatic phase control in amplifiers [Reported at the MEI Annual Conference and at the NTORiE Conference, 1964]

SOURCE: Elektrosvyaz', no. 6, 1966, 44-52

TOPIC TAGS: electronic amplifier, rf amplifier, automatic phase control

ABSTRACT: A possibility is discussed of stabilizing the phase of an rf amplifier by means of an automatic-phase-control feedback loop.



Phase modulator PhM (see figure) is intended for compensating phase drifts that arise in rf amplifier RFA; these two devices may be designed as a joint unit or as separate units. Phase detector PhD produces an error signal which is due to a deviation of the output-input phase

UDC: 621.396.647

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L 03620-67

ACC NR: AP6019012

difference from its nominal value. To reduce this error signal to zero, a phase shifter is connected to one of the PhD inputs; this makes a phase-difference reference unit. The error signal between PhD and PhM can be amplified by a d-c amplifier with a 1-f filter LFF, which should take into account the inertia of the d-c amplifier and PhD. The error signal e applied to PhM corrects the phase deviation. Stabilizing characteristics of the automatic phase control are studied by setting up and examining its differential equations. The operation of the automatic phase control is illustrated by an example of a simple single-circuit resonant rf amplifier, with a reactance tube playing the role of PhM. The small-disturbance stability of the automatic-phase-control system is investigated for the cases of single-section and two-section RC filters. Orig. art. has: 7 figures and 29 formulas.

SUB CODE: 09 / SUBM DATE: 20Jan65 / ORIG REF: 003

Card 2/2 awm

UTKIN, G.N.

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Vest.AN SSSR 25 no.8:84-86 Ag '55. (MIRA 9:1)
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UTKIN, G.N.; MALYUTINA, G.N., red.; KOSTINSKIY, D.N., red. teksta; GREVTSOVA, V.A., tekhn. red. kart

[Tunisia; 1:1 000 000] Tunis; 1:1 000 000. Moskva, Gos. izd-vo geogr. lit-ry, 1962. ___ Utkin, G.N. Text. 1962. 13 p. (MIRA 15:4)

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(MIRA 17:3)

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(Arabic studies--Congresses)

UTKIN, I

Alkaloids of Senecio macrophyllus. A. Danilova, I. Utkin, and P. Massagetov (S. Ordzhonikidze All-Union Sci. Research Chem.-Pharm. Inst., Moscow). *Zhur. Obshchei Khim.* 25, 831-4; *J. Gen. Chem. U.S.S.R.* 25, 797-9(1955)(Engl. translation).—Conventional extn. of 18 kg. dried plant with $(CH_2Cl)_2$ in the presence of 10% NH_4OH, followed by extn. of the ext. with 10% H_2SO_4, liberation of the bases from the acid soln. with NH_4OH and extn. with Et_2O and $CHCl_3$ gave about 25 g. mixed alkaloids. The Et_2O-sol. material in EtOH was treated with alc. tartaric acid until acid reaction was reached, yielding 2.16 g. tartrate; the $CHCl_3$-sol. fraction of the alkaloids gave 2.76 g. tartrate. This last after crystn. from EtOH gave 2.5 g. pure *macrophylline bitartrate*, $C_{17}H_{25}O_8N$, m. 162-4°, $[\alpha]_D$ 52.3° (H_2O). This with NH_4OH gave free *macrophylline* (I), $C_{11}H_{19}O_3N$, purified by sublimation in high vacuum, m. 42-4°, $[\alpha]_D$ 34.52° (EtOH). Hydrolysis with 15% HCl gave angelic acid and *macronecine-HCl*, $C_8H_{15}O_2N.HCl$, m. 152-3°, $[\alpha]_D$ 49.37° (EtOH). The latter with NaOH gave free *macronecine*, $C_8H_{15}O_2N$, m. 126-8° (from Me_2CO), $[\alpha]_D$ 49.29° (EtOH), almost insol. in Et_2O. Hydrogenation of I over PtO_2 gave *hydromacrophylline*, m. 87-8°, $C_{13}H_{23}O_3N$, which heated with 10% HCl gave a liquid acid which was not identified owing to small amt., and *macronecine-HCl*, m. 150-1°.

G. M. Kosolapoff

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(2)

UTKIN, I.A. DECEASED ~~1961/3~~ 1962/4

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MEDIC__E AND BIOLOGY

UTKIN, I. A.

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1. Boring
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[Exploratory drilling with the ZIF-300 drilling unit; practical manual] Razvedochnoe burenie stankami ZIF-300; prakticheskoe rukovodstvo. Leningrad, Gos. nauchno-tekhn. izd-vo neftianoi i gorno-toplivnoi lit-ry, 1954. 221 p. (MLRA 7:9)

(Boring machinery)

UTKIN, I.A.; SHAMSHEV, F.A.

New machinery used in exploratory drilling. Sov. geol. no.60:190-200 '57. (MIRA 11:3)

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(Boring machinery)

14(5) SOV/132-59-9-5/13

AUTHORS: Utkin, I.A., Isayev, M.I., Agapchev, M.I., Agafonov, ~~V.G., and~~ Galiopa, A.A.

TITLE: The Utilization of Small Turbo-Drills for Core Drilling

PERIODICAL: Razvedka i okhrana nedr, 1959, Nr 9, pp 29-32 (USSR)

ABSTRACT: According to experimental data obtained from L.A. Shreyner, G.N. Pokrovskiy, A.A. Minin, and A.A. Pogarskiy, mechanical drilling speed increases with an increase in the number of rotations of the drilling bit. The authors state that the number of rotations must not exceed 300-400 rotations per minute even with ZIF types of drilling rigs, this limitation being due to the necessity of rotating the drive-pipes together with the drilling head. Thus the drilling productivity could be increased only when turbo-drills were used, in which case the drive-pipes do not rotate. The commercial drilling speed of turbo-drills is 1.8 times higher than that of rotary drilling and 5 times higher than with the ZIF-1200A rig. The use of the

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SOV/132-59-9-5/16

The Utilization of Small Turbo-Drills for Core Drilling

turbo-drill TS4-5 for structural drilling in Bashkiriya increased the drilling speed 5 times. The number of breakdowns were also cut down. For instance, the breakdown coefficient in the trest Bashzapadnefterazvedka (Bashzapadnefterazvedka Trust) decreased from 4.78 to 1.28 in comparison with rotary drilling. The small-sized drills were not widely used for the core-sample drilling, as only 28% of the core was satisfactorily extracted, when turbo cutters KTD3-5 (127 mm) or KTD3-5" were used. The problem was satisfactorily solved, when the VITR developed a new TSChM-5" turbo-drill. This drill is provided with special bits with armored cutters made of a hard alloy. The number (m) of such cutters for each bit was calculated according to the formula

$$m = \frac{R_{hyd}}{C_o}$$

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The Utilization of Small Turbo-Drills for Core Drilling

where R_{hyd} is the hydraulic load on the axis of the turbo-drill in kg and C_o - permitted load for one cutter in kg. The RSChM-5" turbo-drill was tested on the Svidnitskaya ploshchad' tresta L'vovneftegazrazvedka (the Svidnitskaya Ploshchad' of the L'vovneftegazrazvedka Trust) with the BU-40 installation and the U8-3 pump. With this drill, 50 to 80% of the cores were extracted at a speed of 3.3 m/hour, whereas only 20 to 30% of the cores were extracted with the use of drive-pipe with the milling-cutter head SDK-Nr 8 and at a speed of 1.16 m/hour. It was also found that the mentioned drilling bits can be used for rock of up to VII category of drillability. The bits quickly wear out in harder rocks at a speed of 800-900 rotations per minute. There are 2 tables, 2 diagrams and 4 Soviet references.

ASSOCIATION: VITR

Card 3/3

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(Rock drills)