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GENERAL PROBLEMS OF ELECTROMECHANICS

Verzhbitsky L.G., Kamsha M.M. (JSC «NIIEM»)

ENGINEERING METHOD FOR CALCULATING PARAMETERS OF BINOMIAL TESTS OF ELECTRICAL MACHINERY

The article deals with a theoretical justification of engineering method enabling to calculate parameters of binomial tests of electrical machinery (number of machines and duration of their testing) for experimental confirmation of correspondence of machines to required by technical assignment probability of no-failure operation at confidence factor β . An algorithm and program of implementation of the developed method on PC having Mathcad 6.0 PLUS or later software version are given. The method is based on admission, well-founded earlier by other authors, that the resulting failures distribution in electrical machinery with sufficient for practical purposes accuracy can be accepted as corresponding to a logarithmic-normal rule with value of denary logarithm of mean square deviation from operation mean time before $\sigma lg = 0.3$ failure. The method enables to determine the test duration according to quantity of machines under testing. However, the final selection of test duration and corresponding to it number of machines shall be performed as per carried out computations results so that there is some confidence that the selected test duration is admissible for crucial components of electrical machinery. Key words: method of calculation, test parameters, electrical machinery, probability of no-failure operation, confidence factor, operating time, technical assignment.

Grabilin A.O., Zubrenkov B.I., Shmatkov A.V. (FGUE «NPP VNIIEM»)

INFLUENCE OF RESONATING CHARACTERISTICS OF BOLTS ON VIBRATION CONTROL RESULTS......11 Resonating characteristics of bolt joining bearing surfaces, foots and flanges of special-purpose electric machines and their influence on vibration control results are under consideration herein. A brassboard was under the testing. The test results are provided. It has been established that the resonating characteristics of bolts should be taken into account as a systematic inaccuracy of measurements when estimating vibrations of machines in high frequency range.

Key words: electric machines, vibration, vibration control, measuring bolts.

SPACE ELECTROMECHANICS. SPACECRAFT

Volkov S.N., Kazantsev S.G., Fryantsev A.V. (FGUE «NPP VNIIEM»)

Prokoshev V.G. (SEI HPT «VSU»)

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Key words: multispectral survey, earth remote sensing, neural network, training.

Khodnenko V.P., Khromov A.V. (FGUE «NPP VNIIEM»)

It was considered a mathematical model of spacecraft propulsion system designed for getting an accurate understanding on processes in spacecraft (SC) electric power supply system during engine unit operation. The interaction between the primary power source, converting facility, storage battery, and load during several flight resolutions including degradation of solar and storage battery are simulated. The mentioned simulation enabled to analyze mutual operation of power supply system and correcting engine unit of «Kanopus-V» Ne 1 SC, determine electrical capacity backup of SC, and propose its rational use. Operation of the correcting engine unit at energy revolution mode and SC disposal strategy were considered as well.

Key words: mathematical model, correcting engine unit, power supply system, power obtaining, solar array, storage battery.

Gusev A.A. (FGUE «NPP VNIIEM»)

MATHEMATICAL MODEL OF ON-BOARD RADAR FACILITY SLOTTED WAVEGUIDE ANTENNA POWER RACK25 A mathematical model of on-board radar facility slotted waveguide antenna power rack is described in details herein. The mathematical model has been developed based on power rack construction raw data in which telemetry data obtained from «Meteor-M» No 1 SC during space flight testing were taken into account. Results of simulation of one power rack wing and analysis are given as well. The simulation has been conducted in Matlab Simulink packet using SimMechanics library. Key words: power rack, opener, spacecraft, on-board radar facility, mathematical model.

Sergeyev S.N. (FGUE «NPP VNIIEM»)

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Kazantsev Yu.M., Gordeyev K.G., Lekarev A.F., Gavrilov A.M. (JSC «SPC «Polyus»)

SPACECRAFT POWER SUPPLY SYSTEM WITH INTEGRATED VOLTAGE UP-CONVERTER..... A spacecraft power supply system running on solar array i-v curve current zone is under examination. A structure in which functions of voltage stabilizer of the solar array, storage battery charge and discharge are integrated by a magnetically connected filter is proposed.

Key words: power supply system, solar array, storage battery, up-converter, magnetically connected filter, key element.

ELECTROMECHANICS AND SOCIOECONOMIC DEVELOPMENT OF THE COUNTRY

Utkin A.V. (FSUE «SNPO «Electron») Evseyev I.V. (SRF Military Academy n. a. Peter the Great) Golikov R.Yu., Tarasov O.A. (FSA «12 TsNII of RF Defense Ministry») EXPERIMENTAL RESEARCH OF FIRMNESS AND STABILITY OF TRIBO-ELECTRICAL VIBRATION PERIMETER SENSING EQUIPMENT OPERATION UNDER THE CONDITIONS OF LIGHTNING DISCHARGE INFLUENCE ELECTROMAGNETIC FIELDS45 Results of testing perimeter means and detection systems are quoted. Passive vibration protection means are under consideration. Results of comparative tests for firmness to electromagnetic fields of lightning discharge of two series-produced specimens of tribo-electrical vibration perimeter means are quoted. The results of the work have been used to determine the most effective scheme-technical decisions with regard to protect input data circuit and elements of means.

Key words: perimeter detection means, tests, vibration protection means, electromagnetic field endurance, input circuits.

Kryukov A.P., Puzina Yu.Yu. (FSBEI «NRU MEI»)

ANALYSIS OF HEAT AND MASS TRANSFER PROCEDURES IN EXPERIMENTAL CELL IN CONNECTION WITH PRESCHEDULED RESEARCH OF BOILING SUPERFLUID HELIUM ON INTERNATIONAL SPACE STATION.....

A version of experimental cell structure for superfluid helium boiling research at weightlessness with orbicular heater inside the cylindrical porous structure is under consideration. The research objective is to determine structural properties with the help of which one can visualize dynamics of steam film on sphere surface. At that the principle attention is paid to heat and mass transfer processes in superfluid helium being in constrained conditions. The interpretation based on the proposed approach of recently published experimental data on superfluid helium boiling in microgravity conditions is presented herein.

Key words: superfluid helium, weightlessness, boiling, motion, boundary surface, porous structure.