ABSTRACTS

### ВОПРОСЫ РАДИОЭЛЕКТРОНИКИ

### серия

### ТЕХНИКА ТЕЛЕВИДЕНИЯ

### 2020 вып. 4

*Galenitsky A. V., Samorodov A. A.* **The method of evaluating potentially realized probabilities of recognition of objects of three and more classes by Fisher's linear discriminator in training mode. PP. 3–11.** A technique for evaluating the potentially realized probabilities of object recognition based on training samples used by Fisher's quasi-optimal discriminator is presented. To assess the one-dimensional distribution densities of informative features, the normal contribution method is used. The results of applying the technique to the recognition of radio images of marine targets are presented. **Keywords:** recognition probability, Fisher linear discriminant, normal contribution method.

*Ivanov V. G., Kamenev A. A.* **Assessing threshold contrasts of ground-based objects in the presens of a heterogeneous background on infrared scene images. PP. 12–18.** It has been developed a methodical approach to assessment of threshold contrasts of long ground objects on the space-heterogeneous background infrared images of scenes obtained by the on-board thermal imaging cameras in the face of small differences the temperature of the object of interest and the surrounding background. **Keywords:** image, contrast, terrestrial object, detection, distinguishing, thermovision optical-electronic means, background underlying surface

*Zakutaev A. A., Protsenko P. A., Skripnikov A. N*. **Orbit selection technique remote sensing space earth for increasing the frequency of observation of a specified area. PP. 18–25.** An algorithm is proposed for calculating the coordinates of the points of double view of the given areas of the Earth's surface. On its basis, a technique has been developed for selecting the parameters of circular quasi-synchronous orbits for remote sensing spacecraft, which ensure an increase in the observation frequency of these areas. The effectiveness of the proposed technique is shown on the example of observing a given area by the «Resurs-P3» Earth remote sensing spacecraft. **Keywords:** remote sensing of the earth, quasi-synchronous orbit, dual view points

*Oleinikov M.I., Chesta O.I., Korolev S.Y., Lebedev V. I* **Using reflection models to determine the characteristics of space objects based on optical observations. Pp. 26–35.** The principles of using reflection models to determine the characteristics of space objects based on the results of optical observations are considered. Influence of the model parameters to possibility of inverse problems solution are shown. Methods for solving the problems of determining the space objects overall dimensions and its elements orientation using surface reflection models proposed in the paper. **Keywords:** reflection model, bidirectional reflectance distribution function, optical performance, spectral and energy characteristics of a space object.

*Pospelov G.V., Rubtsov N.S., Savin S.V.* **Limitation of space object detection range by off-axis flux of optical system. PP. 36–44.** Main sources of off-axis flux for space optics and its reduction methods are described. Methods of calculation of Sun off-axis flux influence to detection range in infrared are proposed. **Keywords:** infrared, space object, off-axis flux

*Kamenev A. A., Tonyshev A. Y.* **The model of formation reflective characteristics of typical underlying surfaces of the ground scenes in the visible and near-infrared range. PP. 45–53.** Physics principles and the corresponding model of the formation reflective (spectric-energy) characteristics of typical underlying landscape surfaces are considered. This makes it possible to obtain with a higher resolution the spatial, angular, temporal, spectral distribution of values of the simulated photometric quantities for use in optimizing the parameters of the created multispectral optoelectronic observation equipment. The results of the calculation and interpolation of multi-temporal data in the intra-seasonal variations in the spectral brightness coefficients of a number of typical underlying surfaces in the spectral range of 0,4…2,5 μm are presented. **Keywords:** spectral brightness coefficient, optoelectronic observation equipment, underlying surface, scene, fond-object situation.

*Vasiliev P. V., Avdyakov V. A.., Galich R. G.* **Method of proportional rapprochement with variable navigation parameter in the conditions of the disturbing impact of the operating impact on the accuracy of measurements of the onboard optical-electronic coordinator. Рр. 54–62.** The advanced method of proportional rapprochement with variable navigation parameter for application in control systems of rapprochement of high-speed objects in the conditions of the disturbing influence of managing directors of accelerations of the operated object on the accuracy of measurements of the onboard optical-electronic coordinator is presented. **Keywords:** method of proportional convergence, the onboard optical-electronic coordinator, the high speed convergence.

*Kryachko M. A., Dvornikov S. V., Kryachko A. F.* **Analysis of the distribution of amplitude field distortions at antenna opening with boundary effects. PP.  753–68.** The article presents the results of a study of the possibility of obtaining quantitative indicators for a constructive assessment of the quality of antennas. Analytical expressions are given connecting the values of the amplitude distortion factor of the field at the antenna aperture with the value of the efficiency and the crest factor. Graphical dependencies are demonstrated that reveal the essence of the developed approach. Recommendations for practical application are formulated. **Keywords:** field distortion at the antenna aperture, pair echo method, field amplitude change factor, peak-factor of radiation power.

*Yakushenko S. A. Dvornikov S. V.* **Methodology for assessing the stability of integrated navigation, communication and control systems. PP. 69–80.** The paper proposes a method for assessing the stability of complex systems consisting of heterogeneous elements of various functional purposes under the influence of destabilizing factors. A special feature is the use of a hierarchical approach and taking into account the specifics of building integrated navigation and communication systems. The developed method makes it possible to conduct a comparative assessment of complex systems and formulate requirements for the stability of promising navigation support systems. **Keywords:** stability of complex systems, navigation support system, destructive effects

*Vorobiov D. N., Kupriyanov N. A., Onufrey A.Yu.* **Algorithmic implement­tation of comparing trajectory data by long-range detection radar. PP. 81–88.** The article deals with the problem situation caused by the use of a limited number of navigation satellites to solve problems of accounting for the influence of the propagation environment in radar stations. To solve the problem, it is proposed to use measurement discrepancies of cataloged space objects for comparing trajectory data. An algorithmic implementation of comparing trajectory data by long-range radar detection is proposed and its main stages are described. **Keywords:** long range radar station, space object, radio wave propagation medium, full electronic content

*Onufrey A. Y., Razumov A.V., Vaganov A. A.* **Method for evaluating the reliability of information about the detection of small-sized high-temperature objects. PP. 89–96.** The method of estimation of reliability of information of detection of small-sized high-temperature objects from Board of small low-orbit space vehicles of remote sensing of the Earth is considered. Methods for calculating the probabilities of reliable detection and false detection by optical-electronic equipment operating in the infrared spectral range are given. **Keywords:** remote sensing of the Earth, forest fires, optical-electronic equipment, small spacecraft, probability of reliable detection, infrared range

*Gukov S. Y., Musikyan A. T., Turlikov A. M.* **Method for compressing composite video in real time when transmitting the user interface between remote devices. PP. 97–103.** The method of composite video compression implemented on modified H.264 suitable for real-time desktop transmission technologies is considered. The results of experimental comparison of the modified H. 264 codec with the original H. 264 and H. 265 HEVC in SCC mode are given. **Keywords:** compound video, video compression, block compression method, adaptive quantization, user interface transfer.

*Kamyshev A. L., Fedyai E. A.* **Algorithms for determining the angular coordinates and angular velocities of the line of sight of moving objects by a meter located on a movable base. PP. 104–111.** Are methods and algorithms of measurement of coordinates and angular velocity of the line of sight of high-accuracy meter located on the moving base, based on the pattern contours tracking and stabilization, allowing to minimize the parasitic motion of the stabilized platform in the measurement interval due to incomplete attenuation of disturbances. **Keyword:** tracking and stabilization system, optoelectronic system, matrix CCD receiver

*Kapitonov D. A, Morozov A. V, Denisov A. V., Sashin D. I., Gorokhova K. A., Isakov I. D., Chepelev A. G.* **Device and basic principles of operation of the automated control system ASK OL-500. PP. 112–122.** The composition, device, purpose, functional features and basic principles of the automated control system ASK OL-500 are considered. **Keywords:** control and testing equipment, television complex, space television

*Demin A.V., Sechak E.N.* **Assessment of image quality and temperature resolution in heat direction finders. PP. 123–127.** The results of work on the development and testing of a method for evaluating image quality and temperature resolution for a heat direction finder in a shop environment are presented. **Keywords:** heat direction finder, infrared radiation range, photodetector, lens, image quality, temperature resolution.

*Sechak E. N.* **A method for controlling composite mirrors. PP. 138–133.** A variant of constructing an optoelectronic complex with the main mirror in the form of a composite segmented structure with active control of the surface shape is considered. An approach is proposed for stabilizing the spatial position of the composite mirror elements. A method has been developed for positioning the position of the composite main mirror for creating an optical-electronic complex for remote sensing of the Earth. **Keywords:** optoelectronic complex, mirror, remote sensing, adaptive optics, composite mirrors.

**A note on 31st International Scientific and Technical Conference «Extreme robotics». PP. 134–135.**