METHOD FOR FORECASTING PERFORMANCE CHARACTERISTICS OF SPACE TRAWLER (p. 4-7)

Peter Horolsky, Ludmila Dubovik

The paper considers the issue of cleaning low-Earth orbits from space debris and proposes one of possible solutions by using a special spacecraft - space trawler, containing a propulsion system and a system of collecting and removing small space debris in the form of a spherical debris-catching device. The principle objective of the research is development of the method for forecasting spacecraft performance characteristics, based on ensuring high target efficiency of the proposed cleaning method. The trawler operation efficiency is supposed to estimate by the collecting surface area of the debris-catching device, crossing the specified layer of the near-Earth space. The proposed method allows defining the basic properties of a space trawler for all possible investigated maneuvers of the spacecraft at the cleaning stage, from its primary delivery on the initial orbit, various ways of trawler and debris-catching device launch, as well as various types of rocket carriers and propulsion systems. This method can be used in forecasting the space trawler performance properties, corresponding to its optimal launch and maneuvering mode, thus providing a choice of efficient alternative of spacecraft for collecting small debris, the use of which for cleaning low-Earth orbits will increase safety of space flights

Keywords: low-Earth orbits, space debris, space trawler, high efficiency

Referenses

1. Horolsky, P. G., Bezuglyj, V. A. (2011). Analysis of methods of space debris removal. System designing and the analysis of characteristics of space engineering, Dnepropetrovsk, Ukraine, XI, 128-135.
2. Dron, N. M., Kondrat'ev, A. I., Horolsky, P. G., Dubovik, L. G. (2010). Space trawler for clearing of a near space from space debris. The reports collection of participants of the sixth all Ukrainian scientifically-practical conference «Innovative potential of the Ukrainian science – XXI centuries», 134-136.
3. Dron, N. M., Dubovik, L. G., Kondrat'ev, A. I., Khitko, A. V., Horolsky, P. G., (2010). Debris-gatherings with EP characteristics at two versions of maneuvers of their injection into a demanded orbit. Space Science and Technology, 16, 5, 59-61.
4. Dron, N. M., Kondrat'ev, A. V., Horolsky, P. G., Dubovik, L. G. (2010). The basic performances of the space trawlers used for clearing of a near space. Technical Mechanics, 2, 87-92.
5. Dron, N. M., Horolsky, P. G., Dubovik, L. G. (2011). Efficiency of clearing a near space at the separate injection of a space trawler and the catching device. The reports collection of scientific conference «Information technology in control of difficult systems, Dnepropetrovsk: Svidler, 202-205.
6. Dron, N. M., Horolsky, P. G., Dubovik, L. G. (2011). Efficiency of clearing low-altitude orbits a space trawler at use of several devices for catching space debris. System designing and the analysis of characteristics of space engineering, Dnepropetrovsk, Ukraine, XII, 36-45.
7. Horolsky, P. G., Dubovik, L. G. (2012). To selection of the launch vehicle for delivery to an initial orbit of debris-gathering spacecraft. Aerospace Technique and Technology, 9/96, 142-145.
8. Kondrat'ev, A. V., Horolsky, P. G., Dubovik, L. G. (2009). Thrust and powermass characteristics calculation procedure debris gathering spacecraft with EPS. Aerospace Technique and Technology, 10(67), 82-84.
9. Umanskiy, S. P. (2001). Launch vehicles, space ports. Moscow: Restard+, 216.
10. Working out UTEP for near-earth inter-orbital transfers (2004). The technological report, Dnepropetrovsk: SKB «Southern», 150.
11. Isakowitz, S. J. (1991). International Reference Guide to Space Launch Systems. Second Edition. Washington: American Institute of Aeronautics and Astronautics, 341.

THE REGULARITIES OF DEMAND FORMATION ON PASSENGER TRANSPORT SERVICE (p. 8-10)

Alexander Rossolov

The results of studies to determine the regularities of the demand of the population of large cities in Ukraine for urban passenger transport are shown.

It is known that the mapping of movement is the demand for passenger correspondence matrix, which is usually calculated by the gravity models.

These models do not allow a high degree of accuracy and reliability of information about the mobility needs of the urban population. In this regard, it is suggested to model the demand in a range that ensures the presence of a significant embodiment passenger correspondence matrix. The process of formation is considered as a stochastic demand, based on what the algorithm simulation model of the formation of the matrix of options passenger correspondence has been made.

As a result of experimental studies it has been obtained regularities of change in the value of the passenger transport work in various states of demand for travel.

In addition it has been obtained the regularity of change of medium-range of travel distance and found it the most probability value.

The resulting distribution law of the transport work has a very low variance and coefficient of variation. It is possible to considerably reduce the interval close to the real version of the O-D matrix by eliminating from consideration the extreme variants of it states

Keywords: transport region, original destination matrix, simulation experiment, regulation law

References

1. Yefremov, I. S., Kobozev, V. M., Yudin, V. A. (1980). Teoriya gorodskikh passazhirskikh perevozok : Ucheb. posobiye dlya vuzov. M. : Vyssh. Shkola. 535 p.
2. Zablotskiy, G. A. (1968). Metody rascheta potokov passazhirov i transporta v gorodakh. M. : TsNTI po grazhd. stroit. i arkhit. 92 p.
3. Dolya, V. K. Problemy transportnykh sistem (1999). Kharkov: KhGADTU. 100 p.
4. Ortuzar, J. de D., Willumsen, L. G. (2006). Modelling transport. Third edition. John Wiley & Sons Ltd. 499 p.
5. Winston, C., Small, K. A. The Demand for Transportation: Models and Applications. C.: Univesity of California. 51 p.
6. Gorbachev, P. F., Rossolov, A. V., Kostenko, K. V. (2011). Intervalnoye modelirovaniye sprosa na trudovyye peredvizheniya v krupneyshikh gorodakh. Visnik Skhidnoukrainskogo natsionalnogo universitetu imeni Volodimira Dalya, 159, 248-253.
7. Gorbachov, P. F. Nova kontseptsiya modelyuvannya potreb naselennya u trudovikh peresuvannyakh miskim pasazhirskim transportom. (2009). Visnik Dnipropetrovskogo natsionalnogo universitetu zaliznichnogo transportu imeni akademika V. Lazaryana, 27, 210-214.
8. Rossolov, A. V., Lyubyy, Ye. V. (2013). Determination of o-d matrix variability degree. Eastern-European Journal Of Enterprise Technologies, 1(4(61)), 43-47.
9. Shannon, R. E. Systems simulation: the art and science. (1975). Prentice-Hall. 387 p.
10. Emelyanov, A. A., Vlasova, Ye. A., Duma, R. V. (2002). Imitatsionnoye modelirovaniye ekonomicheskikh protsessov : ucheb, posobiye. M.: Finansy i statistika. 368 p.

PERSPECTIVES OF AUTOMATED VESSEL POSITIONING CONTROL (p. 11-14)

Andrey Smolyanov, Nadezhda Sokolova

The author indicates that the development of modern sea and river fleets is one of strategic trends of the native transport infrastructure development.

The paper gives reasons for the necessity and perspectives of theoretical and practical developments in the field of automated vessels positioning and their importance at the present stage of transport infrastructure development, native water transport in

particular, as Ukraine is one of the marine European countries with perspectives of developing its export-import relationships. The author reckons that using a host module enables determining a deviation of the vessel original coordinates from their real values, selection of optimal control laws for reducing the magnitude of deviation, i.e. the positioning error.

The module defines the correspondence between a variety of actual values of temporally changing positional vessel coordinates, which requires positioning, and a variety of original coordinates for ensuring the given spatial vessel position. In the paper, we have made a conclusion that the development of modern sea and river fleets of the country is mostly determined by technical and technological levels of automation of vessel controlling processes, by their positioning in particular, aimed at increasing the safety of passengers, cargos and environment.

Further AVPCS (Automated Vessel Positioning Control System) integration in a general IT environment will improve the quality and reduce the complexity of decisions for vessel positioning, and foster the safety of passengers, cargos and environment in general

Keywords: automated control, control system, automated vessel positioning control

References

1. Baranov, G. L., Mironova, V. L., Tihonov, I. V. (2012). Aksiomatika algoritmichnih peretvoren' v intelektual'nih sistemah navigacii ta upravlinnja ruhom suden. Avtomatizacija sudovyh tehnicheskih sredstv, Vyp.18, 3-12.
2. Vagushhenko, L. L., Cymbal, N. N. (2007). Sistemy avtomaticheskogo upravlenija dvizheniem sudna. Ed. 3. Odessa: Feniks, 328 p.
3. Gabruk, R. A. (2011). Ocenka bezopasnosti moreplavanija sudov, osushhestvljajushhih dinamicheskoe pozicionirovanie. Sistemi upravlinnja, navigacii ta zv'jazku, Vip. 2 (18), 19-21.
4. Intellektual'nye reshenija dlja korablej i sudov. Available: http://avrorasystems.com/ru/.
5. Mezhdunarodnaja konvencija po ohrane chelovecheskoj zhizni na more 1974 goda. (2002). SPb: ZAO CNIIMF, 928 p.
6. Mezhdunarodnaja konvencija po preduprezhdeniju stolknovenija sudov v more 1972 goda (MPPSS–72). (2004). SPb: ZAO CNIIMF, 118 p.
7. Mijusov, M.V., Torskij, V.G. (2009). Problemy obespechenija bezopasnosti sudohodstva Chernogo i Azovskogo morej. Sovremennye problemy povyshenija bezopasnosti sudovozhdenija: materialy nauchno-metodicheskoj konferencii. Odessa: IzdatInform ONMA, 76 – 80.
8. Pozicionirovanie sudov. FGBU «Centr sistemy monitoringa rybolovstva i svjazi». Available: http://www.cfmc.ru/index.php/positioning.
9. Holodov, G.G. Trebovanija nacional'nyh morskih klassifikacionnyh obshhestv k rabotam na morskih shel'fah i sistemam orientacii sudov, osnashhennyh sistemami dinamicheskogo pozicionirovanija, i ih klassifikacija. Available: http://vestnik.mstu.edu.ru/v13_4_n41/articles/14_kholod.pdf.
10. Holodov, G.G., Kalitjonkov, A.N., Men'shikov, V.I. (2010). Obespechenie bezopasnosti pri vypolnenii pozicionirovanija sudna v zadannoj tochke. Deponirovannaja rukopis'; MGTU. Murmansk, 19.

MODEL FORMATION OF OPTIMIZATION OF TRAINS PASSING AT SIDINGS TO MARSHALLING STATION (p. 15-17)

Alexander Lavruhin, Peter Dolgopolov, Yuri Dotsenko

The mathematical model of optimization of trains passing at sidings to marshalling stations was formed based on the scheduling theory.

As the work service devices, the elements of a railway hub are accepted, such as ferrying and block stations, stations and station yards.

As works, freight, passenger and repair trains are accepted, as well as light-running locomotives, going on sidings towards marshalling station. The features of technology of trains passing on

the railway hub elements require parallel-consecutive connection of service devices.

The model allows determining the optimal schedule of trains with minimum delays at each of their uncoordinated arrival to the railway hub.

This significantly reduces unproductive trains downtime - especially during condensation of train flows, delay of trains, and ferrying closing for repair works

Keywords: railway hub, marshalling station, siding, scheduling theory, downtime reduction

References

1. Dolgopolov, P.V., Bovkun, O.O. (2012). Improvement of local work of railway junction on the basis of time-tables theory. Eastern-European Journal Of Enterprise Technologies, 2(11(56)), 30-32.
2. Gruntov, P.S., D'jakov, Ju.V., Makarochkin, A.M. (1994). Upravlenie jekspluacionnoj rabotoj i kachestvom perevozok na zheleznodorozhnom transporte : uchebnik dlja vuzov zh.d. transporta. M.: Transport. 543 p.
3. Tanaev, V.S., Shkurba V.V. In: Judina, D.B. (1975). Vvedenie v teoriju raspisanij. M.: Nauka. 256 p.
4. Tanaev, V.S., Sotskov, Ju.N., Strusevich, V.A. (1989). Teorija raspisanij. Mnogostadijnye sistemy. M.: Nauka. 328 p.
5. Du, J., Leung, J. Y.-T. (1990). Minimizing total tardiness on one processor is NP-hard. Math. Oper. Res., № 15, 483–495.
6. Merkle, D., Middendorf, M. (2000). An Ant Algorithm with a New Pheromone Evaluation Rule for Total Tardiness Problem. EvoWorkShops 2000, LNCS 1803, Springer-Verlag, 287–296.
7. Pinedo, M. (2008). Scheduling. Theory, Algorithms, and Systems. Sprinter Science+Buisness Media LLC. 667p.
8. Martel, C. (1982). Preemptive scheduling with release times, deadlines, and due times. J. ACM, 29, №3, 812–829.
9. Della Croce, F., Grosso, A., Paschos, V. (2004). Lower bounds on the approximation ratios of leading heuristics for the single-machine total tardiness problem. Journal of Scheduling, № 7, 85–91
10. Nakajima, K., Hakimi, S.L., Lenstra J.K. (1982). Complexity results for scheduling tasks with fixing intervals on two types of machines. SIAM J. Comput., 11, №3, 512–520.

JUSTIFICATION OF SELECTION AND ORGANIZATION OF TRAINS FORMATION SYSTEM. PRACTICAL ASPECT (p. 18-20)

Denis Lomotko, Anton Kovalov, Oksana Kovalova

One of the primary goals of railway transport is satisfying the needs of cargo owners concerning their products timely transportation with minimum costs.

The availability of empty transports in proper condition for the planned freight has a significant impact on the quality of transportation process at the railway network. This paper considers the problems of providing freight stations with empty rolling stock.

It proposes improving the freight transportation system by transporting maximum goods on cargo owners requests with minimal costs of basic resources, thus getting maximum income by creation and implementation of the system of inequalities and equations that ensure quality.

The costs function is made for different types of requests for the most efficient request implementation. Analysis of the optimal variant showed that the minimization of the cost function to some extent depends on the level of rolling stock wear which is used in the solution process

Keywords: availability of empty wagons, storage point, formation point, matrix of requests

References

1. Pravdin, N. V., Negrey, V. Ya., Podkopaev, V. A. (2006). Using fuzzy logic to optimize the allocation of scarce resources to train range. Information management system for railways, 4, 10-14.
2. Cheklov, V. F., Cheklov, V. M. Shehovcov, O. I. (2008). Automated distribution of empty wagons. Journal DIAT, 2, 13-18.

3. Kardos, T. Railway Technology Software by Rail Navigator Ltd. – Access mode : http://mobil.innoteka.hu/cikk/railway technology software by rail navigator ltd.490.html.

4. Couto, A. The effect of high-speed technology on European railway productivity growth. – Access mode : http://www.sciencedirect.com/science/article/pii/S2210970612000030.

5. Eliseev, S. U. (2002). Optimal regulation of empty wagons on railways of Russia. Actual problems of traffic management process, 21.

6. Wetzel, H. (2011). Productivity Growth in European Railways: Technological Progress, Efficiency Change and Scale Effects. Working Paper Series in Economics, 101. – Access mode : www.leuphana.de/vwl/papers.

7. Chibisov, U. V. (2012). Improved transportation in railway node by choosing rational flow distribution trains on sections of the site. Distract of the degree of Candidate of Technical Sciences, 23.

8. Akulinishev, V. M., Kudryavcev, V. A., Koreshkov, A. N. (1981). Mathematical methods in railway operation. Textbook, 223.

9. Kovalova, O. (2013). Justification of selection and organization of train-forming system. theoretical background. Eastern-European Journal Of Enterprise Technologies, 3(3(63)), 46-49.

10. Butkevičius, J. Development of marketing strategies in Lithuanian transport companies. Access mode: http://www.tsi.lv/Transport-and-Telecommunication/v61_en/art22.pdf.

ANALYSIS OF THE KNOWN TRAIN FIXING AND RAILWAY BARRIER DEVICES IN MARSHALLING YARD (p. 20-24)

Maxim Kutsenko

In modern conditions only rhythmic and organized work of marshalling stations equipped with the up-to-date devices for mechanization and automation of sorting process will essentially reduce the wagons demurrage.

Today, the brake shoes are used in domestic marshalling stations to stop the wagons, rolling down the hump yard, and prevent them from going beyond the effective length of switch tracks.

Generally, several brake shoes are used, which increases the volume of manual labor, reduces the effective length of body tracks, additional delays while shunting operations, affects the movement and occupational safety. This problem acquires a special significance as a result of the operation of wagons with wheel pairs on roller bearings, the resistance of which is 5 times less than that of wagons with plain bearings, for which most of the hump yards were designed.

This requires using above mentioned braking devices on almost all rails.

One of the promising solutions of this problem is using remote controlled barrier devices. To this end, the paper studied the experience of using such devices in Germany, USA, Japan and other countries.

It was concluded that the experience of developing and using such devices on the railways of developed countries confirms the appropriateness of their use in domestic practice.

However, it was also determined that none of them in the present form can be used on the Ukrainian railways without further modification

Keywords: marshalling station, marshalling yard, buffer stops, beam braking devices, barrier devices

References

1. Rudakov, A. (2011). State program of reforming the railway transport in 2009-2015: Problems and Solutions. Economy, 34, 133-143.

2. Guidelines for the design of low power slides to be equipped by means of mechanization and automation marshal. (1980). Lviv, Transport.

3. Regulations and design standards sorter on the railways of the USSR: Normative production and practical edition. (1992). Moscow: Transport.

4. Muha, A., Tishkov, L., Sheikin, V. etc. (1994). Guide to the application of rules and standards for design sorter: production-practical edition. Moscow: Transport.

5. Comparative analysis of technical equipment for the mechanization and automation of marshalling yards used by Russian Railways and abroad. VNIIAS MPS Russia. Available: www./URL: http://scbist.com/.

6. Siddiqee, M. W. (1972). Investigation of sorting and train formation schemes for a railroad hump yard. Proc. of the 5th Int. Symposium on the theory of trac flow and transportation, 377-387.

7. Hansmann, R. S., Zimmermann, U. T. (2007). Optimal sorting of rolling stock at hump yards. Mathematics - key technology for the future, 8, 189-203.

8. Meuters, G. (1997). Modern car-retardants. Eisenbahningenieur, 2, 17-22.

9. Murphy, G. (1950). Similitude in engineering. The Ronald Press Company.

10. Gopner, M. (1987/1988). Simulation of rolling unhook with hump. Rangiertechnik und Gleisanschlubtechnik, 25-29.

RESEARCH OF ADMISSIBLE BRAKING MODES IN HUMP YARDS (p. 25-28)

Dmytro Kozachenko

The paper presents the research results of cuts braking modes in hump yards.

The objective of this paper is developing the methods for assessment of braking modes of cuts under conditions of fuzziness of their rolling properties, as well as selecting the admissible starting speed range of cuts from brake positions.

As a criterion for assessing the modes of target control of cut rolling speed, it was proposed to use an average window size on a sorting track at the established norms of probable exceeding of admissible speed of wagons at their collision and stop in retarders.

As a criterion for evaluating the modes of a cut rolling speed interval control, using the risk of their non-division on the railway points was proposed.

Using the simulation modeling and mathematical statistics, the configuration of admissible starting speed range of cuts from brake positions has been set.

The scope of this range is 76.7% of admissible starting speed range of cuts from brake positions with respect to target braking terms.

The conducted tests allow simplifying the choice of cut braking modes in systems of automatic control of their rolling speed

Keywords: marshaling yard, hump yard, braking mode, retarder, train splitting (division)

References

1. Muha, J. A., Harlanovich, I.V., Shejkin, V.P. & others. (1985). Automation and mechanization of cars humping at stations. Moscow, USSR: Transport, 248.

2. Bozhko, N.P. (1983). Technique of definition of regimes of braking cuts in the analysis of designs of sorting humps. Voprosy mehanizacii i avtomatizacii sortirovochnogo processa na stancijah: Mezhvuzovskij sbornik nauchnyh trudov, 229/15, 30 - 36.

3. Bobrovsky, V.I., Vernigora, R.V., Kudrjashov, A.V., El'nikova, L.O. (2009). Limitations of braking regimes for cuts on sorting humps. Vìsnik Dnìpropetrovs'kogo nacìonal'nogo unìversitetu zalìznichnogo transportu, 27, 30-35.

4. Bobrovsky, V.I., Kozachenko D.N., Bozhko & others. (2010). Optimization of regimes of breaking of cuts on sorting humps: Monograph. Dnepropetrovsk, Ukraine: Publishing house"Makovetsij", 260.

5. Bobrovsky, V.I. (1999). The searching of optimum regimes of braking on projected sorting humps / Informacijno-keruûci sistemi na zaliznicnomu transporti, 5, 50-54.

6. Tishkov, L. B. (1963). Speeds of cuts in "target" points and "windows" on tracks of the automated humps. VNIIZHT bulletin, 5, 12-17.

7. Bezsonenko, S.A. (2006). Calculation of speed of cuts and capacities of braking positions with use of probabilistic indicators. Transport: nauka, tehnika, upravlenie, 5, 11-16.

8. Kozachenko, D.M., Korobjova, R.G., Taranets, O.I. (2009). Investigation of the impact speed control sliding uncoupled under conditions of uncertainty of information on their navigation properties. Eastern European journal of enterprise technologies //scientific magazine, 6/2(42), 45-50.
9. Kozachenko, D.M. (2010). Optimization criterion of cuts braking mode of calculate group under chance factors. Zbirnik naukovih prac' of Donetsk Railway Transport Institute, 23, 14-21.
10. Kozachenko, D.M. Berezovij, M.I, Taranets, O.I. (2007). Simulation of operation of sorting hump under uncertainty of parameters of cuts and characteristics of the environment. Visnik Dnipropetrovs'kogo nacional'nogo universitetu zaliznichnogo transportu, 16, 73-76.

DEVELOPMENT OF NETWORK MODEL FOR SELECTING THE TREATMENT OF SUBCLINICAL HEART FAILURE (29-32)

Helena Vysotskaya, Larissa Rack, Olga Svatenko

In the process of prescribing an effective therapy cardiologist faces the need to analyze a large number of interdependent symptoms, significantly complicating the treatment. In addition, prescription of medicines for children and teenagers with early-stage chronic heart failure is not provided by treatment protocols.

In this regard, the doctor has to rely on his intuition and experience. Wrong medicine can lead to the patient's condition deterioration and progression of disease.

Using the multi-criteria logic, capable to consider the influence of interacting objects at each other with respect to some other criteria, allows solving this problem. The paper proposes a network model for the choice of medicines for the treatment of teenagers with subclinical heart failure, taking into account the peculiarities of morphological and functional features of heart. Its applying will provide support for decision-making, needed for practicing cardiologists

Keywords: network model, chronic heart failure, teenagers, morphological and functional characteristics of the heart, treatment

References

1. Krzhechkovskaya, V. V., Vakhtangishvili, R. Sh. (2006). Cardiovascular system diseases in children and adolescents. Moscow, Russia: Fenix, 508.
2. Levina, L. I., Kulikov, A. M. (2006). Hebiatrics. St. Petersburg, Russia: Piter, 544.
3. Gurevich, M. A. (2008). Congestive Heart Failure: Guide for Physicians. Moscow, Russia: Practical medicine, 414.
4. Voronkov, L. G. (2004). Primary prevention of heart failure is one of the priorities of modern cardiology. Ukrainian Journal of Cardiology, 4, 9-13.
5. Bleumink, G. S., Knetsch, A. M. , Sturkenboom, M. C. J. M. et al. (2004). Quantifying the heart failure epidemic: prevalence, incidence rate, lifetime risk and prognosis of heart failure – the Rotterdam Study. European Heart Journal, 18, 1614-1619.
6. Minto, W. (2010). Logic, inductive and deductive. Moscow, Russia: KomKniga, 250.
7. Kirillov, V. I., Starchenko, A. A. (1993). Logic. Moscow, Russia: Prospect, 240.
8. Saaty, T. L. (1993). Decision making. The analytic hierarhy processes. Moscow, Russia: Radio i svyaz, 278.
9. Saaty, T. L. (2008). Decision making with dependence and feedback. The analytic network process. Moscow, Russia: LKI, 360.
10. Nogin, V. D. (2007). Decision making with multi-criteria. St. Petersburg, Russia: Utas, 104.

PREDICTING THE RISK OF MEDICAL EQUIPMENT BASED ON FUZZY PROCESSING OF MEASURING INFORMATION (p. 32-35)

Oleksii Polikarpov

Modern methods for determining and predicting the risk of medical equipment take into account only overidentification of measuring information on safety indexes characteristics, which limit the reliability of obtained evaluation of risk possibilities

It is shown that under linguistic uncertainty, increasing the risk evaluation accuracy and safety of medical equipment can be achieved by developing the methods for determination and prediction of risk based on fuzzy processing of measuring information.

The method for risk prediction in infant incubators based on fuzzy processing of air temperature measuring data in children's compartment was proposed.

The presented results of theoretical and experimental investigations confirm the hypothesis of the possibility of increasing the reliability of risk evaluation using fuzzy processing of measuring data on medical equipment safety

Keywords: risk prediction, medical equipment, safety indexes, fuzzy model, evaluation reliability

References

1. ISO 14971:2007, Medical devices – application of risk management to medical devices. (Geneva: International Organization for Standardization, 2007).
2. ISO 13000:2009, Risk management – principles and guidelines. (Geneva: International Organization for Standardization, 2009).
3. IEC/ISO 13010:2009, Risk management – risk assessment techniques. (Geneva: International Electrotechnical Commission, 2009).
4. Polovko, A. (2006). Fundamentals of reliability theory. Saint - Petersburg: BXV- Petersburg Press.
5. Zadeh, L. (1980). Fuzzy sets as s basic for theory of possibility. Fuzzy Sets and systems, 1, 3-28.
6. Dilegenskiy, N. (2004). Fuzzy modeling and multi-objective optimization of production systems in uncertainty conditions: technology, economics, ecology. Moscow: Mashinostroyenie -1 Press.
7. Leonenkov, A. (2005) Fuzzy modeling in MATLAB and Fuzzy TECH. Saint -Petersburg: BXV- Petersburg Press.
8. Polikarpov, O., Fedin, S., Trish, R. (2008). Using fuzzy logic techniques for quality assurance of medical equipment by safety parameters. Navigation systems, communication and control, 3, 99–105.
9. Polikarpov, O., Fedin, S., Zubretskaya, N. (2010). Quality assurance of medical equipment by safety parameters in operation. KNUTD Herald, 1, 68-75.
10. Polikarpov, O., Fedin, S., Zubretskaya, N. (2009). Monitor and prediction of air temperature in infant incubators by using neural network modeling. Navigation systems, communication and control, 1, 102-106.

EVOLUTIONARY OPTIMIZATION OF ELECTROTECHNICAL EQUIPMENT WITH LOOSELY CONNECTED ELEMENTS (p. 36-40)

Alexandr Stanovsky, Pavel Shvets, Alla Toropenko

Despite the large number of types of electrical equipment, little attention has been paid to the fact that almost all of them can be divided into components (subsystems) with different levels of connectivity between the parameters of the latter.

It is shown that multiparameter, multiextreme and multicriteria properties of computer-aided design of loosely connected electrical structures leads to the fact that the best method for optimization is an evolutionary genetic algorithm, adjusted to working with complex connection systems, that ultimately defined the purpose and objectives of the study.

This paper first analyzed the features of such structures, based on computer-aided design requirements, based on which the presented CAD system «EVOSOFT» was created, allowing more profound optimization using advanced evolutionary genetic algorithms.

In the paper new operators of genetic algorithms for optimization of loosely connected systems were given and already known ones were modernized, fuzzy set theory for generation of symbolic models, that fully correspond to the components of real objects, was proposed.

The proposed methods for universal and evolutionary optimization and models for implementation of these methods were used to create a system of computer-aided design of electrical equipment with loosely connected elements «EVOSOFT». Practical testing of the CAD system confirmed its technical and economic efficiency compared with existing systems

Keywords: electrical equipment, loosely connected systems, evolutionary optimization, symbolic models, fuzzy choice

References

1. Gogunskii, V.D., Stanovskaia, I.I., Guriev, I.N. (2013). Problemy kompleksnoy optimizatsyi v upravlenii programmoi sozdaniia odnotipnyh obiektov. Informatsiini tehnologii v osviti, nautsi ta vyrobnytstvi: zbirnyk naukovyh prats, 1 (2), 250 – 255.
2. Gogunskyi, V.D., Gubanov, V.P., Sauh, I.I. (2009). Suchasni tendentsii rozvytku informatsiinyh tehnologii pidtrymky profesiinoi pidgotovky pid chas navchannia v zagalnoosvitnih shkolah. Materialy I vseukrainskoi molodizhnoi naukovo-praktychnoi konferentsii «Suchasni tendentsii rozvytku informatsiinyh tehnologii v osviti», 1, 78 – 84.
3. Gogunskii, V.D., Safonova, A.F., Stanovskaia, I.I. (2011). Avtomatizirovannoe proektirovanie raspisaniia zamknutyh sistem massovogo obsluzhyvaniia. Suchasni tehnologii v mashynobuduvanni: zbirnyk naukovyh prats, 6, 163 – 167.
4. Prokopovich, I.V., Shvets, P.S., Stanovskaia, I.I., Duhanina, M.A. (2012). Adaptivnyi geneticheskii algoritm dlia «miagkih» evoliutsionnyh vychislenii. Pratsi Odeskogo politehnichnogo universytetu, 2 (39), 218 – 224.
5. Prokopovich, I.V., Koriachenko, A.A., Stanovskaia, I.I. (2011). Sistema intellektualnogo monitoringa protsessa litia. Visnyk Odeskoii derzhavnoii akademii budivnytstva ta arhitektury, 44, 278 – 282.
6. Vaisman, V.A., Gogunskii, V.D., Rudenko, S.V. (2009). Teoriia proektno-orientirovannogo upravleniia: obosnovanie zakona Bushueva S.D. Naukovi zapysky Mizhnarodnogo gumanitarnogo universytetu. Naukove vydannia. Seriia «Upravlinnia proektamy ta programamy», 16, 9 – 13.
7. Vaisman, V.A. (2006) Identifikatsiia zhiznennyh tsiklov predpriiatii dlia upravleniia izmeneniiami. Trudy Odesskogo politehnicheskogo universiteta. Spetsvypusk, 15 – 19.
8. Gogunskyi, V.D., Sauh, I.I. (2009). Informatsiini tehnologii organizatsii navchannia v mizhshkilnyh profilnyh kombinatah. Materialy XVII seminara «Modelirovaniie v prikladnyh nauchnyh issliedovaniiah», 23 – 28.
9. Vaganov, P.S. (2012). Postroenie podsistemy upravlieniia riskami v ISUP (na baze PO ORACLE PRIMAVERA). SPb, SPbGUEF Available: tvvlibrary.narod.ru/papers/2011/6-09/.pdf.
10. Vaisman, V.A. (2005) Teoreticheskie osnovy vybora funktsii tseli dlia proektov sistem upravleniia kachestvom. Trudy Odesskogo politehnicheskogo universiteta, 2 (24), 169 – 172.

BUSHUYEV'S LAW –GUARANTEE OF INCOMPLETE TRANSFORMATION OF SERIAL PROJECTS IN OPERATING ACTIVITIES (p. 41-44)

Viktor Gogunskyi, Iraida Stanovska, Ivan Gurev

Although in modern project activity there are programs consisting of separate consecutive projects, which because of many common characteristics: place, time, technology and products, etc., can be called similar or serial, little attention has been paid to features of project activities during implementation of such programs. The features of these projects, their objective constituents and the management psychology is that serial projects tend to gradual transformation of the latter into operating activity.

The paradox has been revealed - the risks of winnings become positive factors of reverse transformation of absorbing level as a result of, for example, contingencies, even such as accidents and catastrophes at the management object. Indeed, destruction of outdated equipment at the plant, on the one hand, is obviously a negative risk, but on the other hand – definitely has positive effects: the possibility of acquiring modern equipment and implementing new technologies that significantly compensate negative effects of the accident.

The paper shows that transformation of project activity into operating one is a major problem of implementation of programs consisting of similar projects.

The creative, variable and absorbing levels of program management opportunities were proposed to distinguish, the role of the Bushuev's law in preventing the "slippage" of projects to absorbing level and ways of such prevention, in particular, using project risks, were determined

Keywords: Bushuev's law, serial designs, creative level, risks of projects, diffusion layer

References

1. Gogunskii, V.D., Stanovskaia, I.I., Guriev, I.N. (2013). Problemy kompleksnoy optimizatsyi v upravlenii programmoi sozdaniia odnotipnyh obiektov. Informatsiini tehnologii v osviti, nautsi ta vyrobnytstvi: zbirnyk naukovyh prats, 1 (2), 250 – 255.
2. Gogunskyi, V.D., Gubanov, V.P., Sauh, I.I. (2009). Suchasni tendentsii rozvytku informatsiinyh tehnologii pidtrymky profesiinoi pidgotovky pid chas navchannia v zagalnoosvitnih shkolah. Materialy I vseukrainskoi molodizhnoi naukovo-praktychnoi konferentsii «Suchasni tendentsii rozvytku informatsiinyh tehnologii v osviti», 1, 78 – 84.
3. Gogunskii, V.D., Safonova, A.F., Stanovskaia, I.I. (2011). Avtomatizirovannoe proektirovanie raspisaniia zamknutyh sistem massovogo obsluzhyvaniia. Suchasni tehnologii v mashynobuduvanni: zbirnyk naukovyh prats, 6, 163 – 167.
4. Prokopovich, I.V., Shvets, P.S., Stanovskaia, I.I., Duhanina, M.A. (2012). Adaptivnyi geneticheskii algoritm dlia «miagkih» evoliutsionnyh vychislenii. Pratsi Odeskogo politehnichnogo universytetu, 2 (39), 218 – 224.
5. Prokopovich, I.V., Koriachenko, A.A., Stanovskaia, I.I. (2011). Sistema intellektualnogo monitoringa protsessa litia. Visnyk Odeskoii derzhavnoii akademii budivnytstva ta arhitektury, 44, 278 – 282.
6. Vaisman, V.A., Gogunskii, V.D., Rudenko, S.V. (2009). Teoriia proektno-orientirovannogo upravleniia: obosnovanie zakona Bushueva S.D. Naukovi zapysky Mizhnarodnogo gumanitarnogo universytetu. Naukove vydannia. Seriia «Upravlinnia proektamy ta programamy», 16, 9 – 13.
7. Vaisman, V.A. (2006) Identifikatsiia zhiznennyh tsiklov predpriiatii dlia upravleniia izmeneniiami. Trudy Odesskogo politehnicheskogo universiteta. Spetsvypusk, 15 – 19.
8. Gogunskyi, V.D., Sauh, I.I. (2009). Informatsiini tehnologii organizatsii navchannia v mizhshkilnyh profilnyh kombinatah. Materialy XVII seminara «Modelirovaniie v prikladnyh nauchnyh issliedovaniiah», 23 – 28.
9. Vaganov, P.S. (2012). Postroenie podsistemy upravlieniia riskami v ISUP (na baze PO ORACLE PRIMAVERA). SPb, SPbGUEF Available: tvvlibrary.narod.ru/papers/2011/6-09/.pdf.
10. Vaisman, V.A. (2005) Teoreticheskie osnovy vybora funktsii tseli dlia proektov sistem upravleniia kachestvom. Trudy Odesskogo politehnicheskogo universiteta, 2 (24), 169 – 172.

USE OF CLOUD COMPUTING SOLUTIONS TO CREATE A STUDENT'S E-PORTFOLIO (p. 45-48)

Natalia Kravets

In accordance with the concept of the Bologna Process, special attention is paid to the increment in the personal activity of students in the educational process. One of the methods used for that is an electronic portfolio.

One of the most pressing problems is to choose the means of the e-portfolio implementation. The present article discusses the possibility of using web-based technologies, education control systems and cloud computing technologies for that purpose. We compared the functional characteristics of the most widespread virtual educational environments and opportunities offered by the respective cloud services.

The paper presents the kinds, main components, target audience and functions of e-portfolio, determines the factors influencing the choice of the instrument of the e-portfolio implementation and provides the overview of those instruments. We formulated the requirements related to the system of the e-portfolio implementation and studied the problems and advantages of using the cloud computing technology for that purpose

Keywords: student's e-portfolio, cloud computing, e-learning, educational activities

References

1. Nory, B. (2013). Practices and tools in online course delivery. Jones University of Maine Business School, USA Christian Graham University of Maine Business School, IGI Global, 288–303.
2. Smolyaninova, O. G. (2008). The use of electronic portfolios in the practice of foreign universities. Informatics and Education, №11, 89–101.
3. Igonina, C. V. (2011). Functions of portfolio students in higher education. 7–th International Scientific and Practical conference «Current problems of human society development», section «Theory and methodology of professional education», London-Odessa, 21.07-28.07 2011, 14–19.
4. Brian, R., von Konsky, Oliver, B. (2012). The iPortfolio: Measuring uptake and effective use of an institutional electronic portfolio in higher education. Australasian Journal of Educational Technology, 28(1), 67–90.
5. Tinnerman, L. (2009). The Use of Web 2.0 Social Networking Technologies to Expedite Collaboration Both in and Out of the University Classroom. In T. Bastiaens et al. (Eds.). Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 200, 3722–3726.
6. Tzu-Chi Yang, Chiang, T. H. C., Yang, S. J.-H. (2012). Creating e-portfolio in U-learning Environment: A Framework of Could-based e-portfolio. IEEE Seventh International Conference, Service Wireless, Mobile and Ubiquitous Technology in Education (WMUTE), 292–295.
7. Quynh Le. (2012). E-Portfolio for enhancing graduate research supervision. Quality Assurance in Education, 20(1), 54–65.
8. Kats, Y. (2013). Learning management systems and instructional design: best practices in online education. Chestnut Hill College, US, 467.
9. Denton, D., Wicks, D. A. (2013). Implementing electronic portfolios through social media platforms: steps and student perceptions. JALN — Journal of Asynchronous Learning Networks, 17(1), 125–135.
10. Kravets, N. (2011). Using technology of «cloud computing» in educational progects. New Collegium, 4, 41–45.
11. Sclater, N. (2010). Cloud computing in education. Policy brief, UNESCO Institute for Information Technologies in Education, Printed in the Russian Federation, 12.

VIRTUAL PROCEDURE ELECTRONIC STORES (p. 49-57)

Tanya Gudz

Virtual enterprise with unstable organizational and territorial structure is becoming the basis of network economy. It is created by selecting the required organizational, technological, human and other resources from different companies and their integration by means of computer networks.

In the similar process virtual electronic shop formation has its benefits, since this informational technology is promoted by the specialists, who are good at fundamentals of IT-technologies, SEO (Search Engine Optimization)-optimization, WEB-design, the peculiarities of content-management, financial accounting, logistics and others.

The present observed forms of virtual enterprise are expected to be modified, adapting to both, future technologies and upcoming demands.

Business expansion of large companies will definitely cause the diversification of some specialization and their transition to affiliates and other entities controlled by the parent company. As a result, companies will form a network of economically dependent on each other partners, which can be seen as the beginning of virtual enterprise.

The article deals with the peculiarities of a virtual electronic shop creation with the agent structure, similar to the virtual enterprise in manufacturing. In this article the technological classification of electronic commerce is conducted, organizational on-line model of electronic shop is presented, the analysis of virtual electronic shop functioning is carried out, the probable method of finding the optimal agent based on average material expenses is suggested

Keywords: information system, virtual enterprise, virtual electronic shop, on-line shop, on-line-model

References

1. Anikina, B. A. (2007). Logistics. Moscow, INFRA–M, 170.
2. Hadzhinskiy, A. M. (2007). Logistics. Moscow, IOTS «Marketing», 256.
3. Nerush, Y. M. (2008). Workshop Logistics. Moscow, TK Velbi, Prospekt, 304.
4. Kataev, A. V. (2001). Virtual enterprise - a new step in the organization NIOKR. The strategic aspects NIOKR management in the context of global competition: Report on NIR № 01.2.00100692. Taganrog, TRTU.
5. Evtiushkin, A. (2000). On the way from Detroit to Hollywood. Commerce World, №4.
6. Uorner, M. (2005). Virtual organizations. New forms of business in the XXI century. Translation from English. Moscow, Dobraya kniga, 284.
7. What types are the online shops. (10.06.2013). Available: http://www.genon.ru/GetAnswer.aspx?qid=59b323c5-fca9-4d8e-b767-098909a2fc13.
8. Classification of Internet-stores. (10.06.2013). Available: http://www.chel-att.ru/raznoe/klassifikatsiya_internet_magazinov/.
9. The organizational structure of the e-shop. (10.06.2013). Available: http://retail-online.ru/stat-i/organizatsionnaya-struktura-internet-magazina-be-k-ofis/.
10. Klochkov, V. V. (2008). CALS-technologies in the aviation industry: organizational and economic aspects. Moscow, HOU VPO MGUL, 124.
11. Overby, E., Bharadwaja, V., Sambamurthy, V. (2006). Enterprise agility and the enabling role of information technology. European Journal of Information Systems, Vol. 15, 120–131.

STAGES OF INFORMATION SEARCH IN THE INTERNET FOR POLITICAL PHENOMENA ANALYSIS (p. 57-60)

Nadya Kanyuk, Andrey Peleshyshyn

This paper deals with topical issue of efficient search of information in the World Wide Web system, information about political phenomena which is subject to further analysis (for example content or event analysis).

3 requirements to information intended for analyzing political phenomena were outlined in the paper: it must be up to date, credible and in sufficient quantity. 6 stages of information search and selection based on these requirements were also proposed: determination of geographical range of information sources, creation of the list of approved sources, concluding a thesaurus, choosing search engines, entering all searches and information selection, ordering search results and grouping them according to the sources

Keywords: search, selection, stages, WWW, analysis, information, political, requirements, up to date, credible

References

1. Dudar, V.V., Zbitneva, M.V., Derev'yanko, A.G. (2008). Zbir i obrobka informacii v Internet z vykorystannyam intelektyalnykh agentive. Intelligence Bionics: Scientific-technical magazine, № 2 (69), 61-66.
2. Uspenskyi, I.V. (2003). Internet-marketyng. St. Petersburg.: Publisher SPDEU.
3. Halashev, V.A. (2011). Systemy poshuku ta obrobky informacii. Educat.-method. Manual, Izhevsk: Udb. State University, 149.
4. Shymanovska-Dianych, L.M. (2001). Osnovy menegmentu (Chastyna 2). Poltava.
5. Popovych, P.Ya. (2001). Ekonomichnyi analiz diialnosti subektiv gospodariuvannia. Ternopil: Ekonomichna dumka, 365.
6. Gendina, N.I. (2004). Informaciino-poshykovi tezaurusy: stryktyra, pryznachennia ta poriadok rozrobky. DSpace at Novosibirsk State University. Available: http://dspace.nsu.ru:8080/jspui/bitstream/nsu/188/1/IPT.pdf.
7. Stepanov, V.K. (2006). Profesiinyi poshyk informacii v internet. Internet v profesiinii informaciinii diialnosti. Available: http://textbook.vadimstepanov.ru/chapter2/glava2.html.

8. Logichni operatory v poshykovykh zapytakh. (2013). Google: Formula poshuku. Available: http://support.google.com/web-search/answer/136861?hl=ru.
9. Gusev, V.C. (2006). Google: Efectivnyi poshuk. Posibnyk, Moscow: Dialektyka.
10. Mindalov, I.V. (2009). Svitovi informaciini resursy Global information resources. E-educat.-method. complex. Available: http://www.kgau.ru/istiki/umk/mir/index.html.

SYSTEM OF DEPENDENCIES FOR ASSESSMENT OF ENTERPRISES QUALITY MANAGEMENT PROCESSES (p. 60-63)

Halyna Trishch

The ISO 9000 standards require the methods for quantitative assessment of quality management systems (QMS) processes. A systemic approach to the QMS analysis allowed identifying their features.

Taking them into account the method of process quality assessment has been worked out.

This paper proposes using one of the limiting distributions of extreme statistics for assessment of the QMS processes quality. Using the symmetry principle with the limiting distribution of the smallest sample, the limiting distribution of the largest sample was obtained, as well as a number of additional intermediate functions. Thus, the system of dependencies of heterogeneous indicators of processes quality with a dimensionless scale was developed, taking into account the significance of the QMS processes.

The proposed system of dependencies can be used at any enterprise for quantitative assessment of the QMS processes quality, that will allow taking into account the process significance and position in the system, as well as the diversity of its quality indicators

Keywords: quality management system, assessment of processes, individual quality indicators, overall index of quality

References

1. ISO 9001:2008. (2008). Quality Management Systems. Requirements, 72.
2. ISO 9000:2005. (2005). Quality Management Systems. Fundamentals and vocabulary, 72.
3. Bychkivskyy, R. V., Hunkalo, A. V. (2005). QMS: Evaluation of the efficiency of. Kharkiv, Ukraine: Standardization, certification and quality, 4, 42 – 46.
4. Zinina, S. S. (2005). Development of methodology for the formation of a set of indicators of process quality. Dissertation. Moscow, Russia, 147.
5. Hunkalo, A. V. (2007). Development of regulatory and methodological framework assessment of quality management systems. Dissertation. Lviv, Ukraine, 175.
6. Novikov, V. M. (2011). Diagnostic self-assessment as an integral part of modern managemen. Kharkiv, Ukraine: Standardization, certification and quality, 2 (69), 38 – 40.
7. Shichkov, N. A. (2005). Selection of methods for measuring quality management system processes. Moscow, Russia: Methods of Quality Management, 2, 14 – 17.
8. Ivanov, V. A., Shilov V. M., Oborin A.V. (2004). Continuous improvement and its place in the QMS. Moscow, Russia: Methods of Quality Management, 4, 41 – 44.
9. Kolesnikov, L. A. (1988). Fundamentals of the theory of system approach. Kiev, Ukraine: Scientific Thought, 176.
10. Adler, J. P. (1969). Introduction to design of experiments. Moscow, USSR: Metallurgy, 202.