SYSTEM IMPLEMENTATION OF COMPUTER-AIDED DESIGN OF CONTROL-DIAGNOSTIC AND TEST OPERATIONS

K.S. Samsonov sams1@bk.ru
A.V. Sevryukova alexandra.sevryukova@gmail.com
A.R. Salakhatdinova ladyxray@mail.ru
A.S. Provatorov sanru41@gmail.com

Bauman Moscow State Technical University, Moscow, Russian Federation

Abstract

The article focuses on the crucial problem of choosing control-diagnostic tools, including technical and economic indicators. From the phenomenological standpoint, we analyze the capabilities of functional instantiation of the relationships array representing the dependencies of the resolving power on the technological production cost. To visually represent the optimization algorithm according to the model, we consider a conditional example of determining the economically rational and optimal number of control and diagnostic tools. The conditional example shows the possibility of achieving the required level of reliability of an individual control and technological element of the general product manufacturing route by implementing a three-fold quality analysis and parrying the consequences of a possible rejection during the technological operation under consideration.

Keywords

Technical innovations, control and diagnostic tools, computer-aided design

References

[1] Barzov A.A., Galinovskiy A.L., Kuznetsov I.E. Prospects of applications of ultrajet diagnosis and quality control of items. *Vestnik UGATU*, 2009, no. 4, pp. 121–126.

[2] Barzov A.A., Galinovskiy A.L., Sal'nikov S.K. The analysis of ultra jet machining kinematic factor effect and optimization. *Vestnik IzhGTU*, 2008, no. 3(39), pp. 4–76.

[3] Barzov A.A., Galinovskiy A.L., Sal'nikov S.K., Elfimov V.M. Efficiency enhancing of ultrajet treatment by means of kinematic factor optimization. *Vestnik MGTU im. N.E. Baumana. Ser. Mashinostroenie* [Herald of the Bauman Moscow State Technical University. Ser. Mechanical Engineering], 2010, spec. iss., pp. 217–228.

[4] Tarasov V.A., Galinovskiy A.L., Efimov V.M. Minimization of technological cost price of hydroabrasive cutting taking into account cost and technological parameters of cutting. *Izvestiya vysshikh uchebnykh zavedeniy. Mashinostroenie* [Proceedings of Higher Educational Institutions. Machine Building], 2011, no. 4, pp. 46–53.

[5] Barzov A.A., Sal'nikov S.V., Galinovskiy A.L. Kinematicheskiy faktor ul'trastruynoy obrabotki materialov i zhidkostey. [Kinematic factor of materials and liquids ultrajet treatment]. *Aktual'nye problemy razvitiya otechestvennoy kosmonavtiki: Trudy XXXII akademicheskikh chteniy po kosmonavtike* [Actual problems of native cosmonautics devel-

opment: proc. XXXII academic readings on cosmonautics]. Moscow, Komissiya RAN publ., 2008, pp. 514–515.

[6] Galinovskiy A.L., Sal'nikov S.K., Suslova A.G., eds. Analiz vliyaniya i optimizatsii kinematicheskogo faktora na povyshenie effektivnosti ul'trastruynoy obrabotki [Effect and optimization analysis on increasing ultra-jet treatment kinetic factor]. *Problemy kachestva mashin i ikh konkurentosposobnosti: materialy 6-y mezhdunarodnoy nauchno-tekhnicheskoy konferentsii* [Machine quality and competitiveness problems: proc. 6th int. sci.-tech. conf.]. Bryansk, BSTU publ., 2008, pp. 285–286.

[7] Barzov A.A., Sal'nikov S.K., Galinovskiy A.L. Model' vliyaniya kinematicheskogo faktora na effektivnost' ul'trastruynoy obrabotki [Model of kinematic factor impact on ultra-jet treatment efficiency]. *Komp'yuternaya integratsiya proizvodstva i IPI-tekhnologii. Sbornik materialov vserossiyskoy nauchno-prakticheskoy konferentsii* [Production computer integration and CALS technologies. Proc. Russ. sci.-practice conf.]. Orenburg, IPK GOU OGU publ., 2007, pp. 108–110.

[8] Galinovskiy A.L., Elfimov V.M., Sal'nikov S.K., Sysoev N.N. Tekhniko-ekonomicheskaya optimizatsiya tekhnologicheskikh parametrov gidrorezaniya [Technical-and-economic optimization of hydrocutting technological parameters]. *Fizicheskaya gidrodinamika* [Physical hydrodynamics], iss. 20, preprint no. 9/2007. Moscow, Lomonosov MSU publ., 2007. 31 p.

[9] Galinovskiy A.L., Petukhov E.N., Sal'nikov S.K., Kharitonov V.N. Using hydrojet technology for aircraft and space technique utilization. *Oboronnaya tekhnika*, 2002, no. 11, pp. 84–86.

[10] Galinovskiy A.L., Sal'nikov S.K., Sayfutdinov R.R., Chornyy I.N., Novozhilov S.A., Medvedeva A.K., eds. Ul'trastruynaya tekhnologiya obrabotki i diagnostiki keramicheskikh i kompozitsionnykh materialov [Ultra-jet processing and diagnostics technology for ceramics and composites]. *Aktual'nye problemy razvitiya otechestvennoy kosmonavtiki: Trudy XXXIV akademicheskikh chteniy po kosmonavtike* [Actual problems of native cosmonautics development: proc. XXXIV academic readings on cosmonautics]. Moskva, Komissiya RAN publ., 2010, pp. 558–559.

[11] Abashin M.I., Barzov A.A., Galinovskiy A.L., Moiseev V.A. Feasibility report of control and diagnostic operations realization. *Fundamental'nye i prikladnye problemy tekhniki i tekhnologii*, 2015, no. 1, pp. 133–139.

[12] Galinovskiy A.L. Innovative capacity analysis of ultra-jet technologies in defense branches of industry. *Oboronnaya tekhnika*, 2008, no. 6, pp. 54–59.

[13] Samsonov K.S., Sevryukova A.V., Kuznetsova T.I. Increasing the system efficiency of the control over the innovative material development. *Gumanitarnyy vestnik* [Humanities Bulletin], 2016, no. 10(48). Available at: http://hmbul.ru/catalog/ecoleg/econom/390.html.

[14] Samsonov K.S., Sevryukova A.V., Poluyanova E.V., Shirshov Ya.N. Providing control and diagnostic operations taking into account technical-and-economic indexes. *Molodezhnyy nauchno-tekhnicheskiy vestnik*, 2016, no. 6. Available at: http://sntbul.bmstu.ru/doc/841021.html.

Samsonov K.S. — student, Department of Rocket-and-Space Engineering Technologies, Bauman Moscow State Technical University, Moscow, Russian Federation.

Sevryukova A.V. — student, Department of Rocket-and-Space Engineering Technologies, Bauman Moscow State Technical University, Moscow, Russian Federation.

Salakhatdinova A.R. — post-graduate student, Department of Rocket-and-Space Engineering Technologies, Bauman Moscow State Technical University, Moscow, Russian Federation.

Provatorov A.S. — post-graduate student, Department of Rocket-and-Space Engineering Technologies, Bauman Moscow State Technical University, Moscow, Russian Federation.

Scientific advisor — A.A. Barzov, Dr.Sc. (Eng.), Professor, Leading Research Scientist, Center for Hydrophysical Research, Lomonosov Moscow State University, Moscow, Russian Federation.