
Designing optimal processing cycles of intragrinding in a multidimensional space of controlling parameters

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The article considers basic principles for designing optimal cycles for internal grinding in a multidimensional space of controlling parameters: axis feed rate, radial feed, etc. For the first time in order to optimize machining process we used such mathematical optimization method as a method of dynamic programming. Its application allows to take into account the full range of technological limitations (on the allowable error of size, on the allowable depth of burn mark and etc.), as well as to replace the exhaustive search of solutions by the targeted one. This reduces the costs and time it takes at manufacture for selection of the optimal characteristics of processing conditions.

Keywords: *internal grinding, optimization of machining process, cycles, dynamic programming.*

REFERENCES

- [1] D'yakonov A.A., Shipulin L.V. Selecting the cutting conditions for plain grinding by the periphery of wheel. *Russian Engineering Research*, Allerton Press, Inc, 2014, vol. 34, no. 12, pp. 804–816.
- [2] Novoselov Yu.K. *Dinamika formoobrazovaniya poverkhnostey pri abrazivnoy obrabotke* [The dynamics of shaping surfaces during abrasive processing]. Sevastopol, Sevastopol State University, 2012, 286 p.
- [3] Nathan R.D., Vijayaraghavan L., Krishnamurthy R. Intelligent estimation of burning limits to aid in cylindrical grinding cycle planning. *Heavy Vehicle Systems*, 2001, vol. 8, iss. 1, pp. 48–59.
- [4] Pereverzev P.P., Popova A.V., Pimenov D.Yu. *STIN — Russian Engineering Research*, 2014, no. 9, pp. 23–27.
- [5] Bellman R. (1957) *Dynamic programming*. [in Russian: Bellman R. Dinamicheskoe programmirovaniye. Moscow, Izdatelstvo inostrannoi literatury, 1960, 400 p.].
- [6] Pereverzev P.P. *Vestnik Yuzhno-Ural'skogo gosudarstvennogo universiteta. Ser. Mashinostroyeniye — Bulletin of the South Ural State University, Series "Mechanical engineering industry"* 2012, № 12 (271), c. 152–157.
- [7] Popova A.V. *STIN — Russian Engineering Research*, 2014, no. 6, pp. 17–22 c.
- [8] Pereverzev P.P., Popova A.V. *Sovremennyye problemy teorii mashin — Modern problems of the theory of machines*, 2015, no. 3, pp. 22–25.

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