II INTERNATIONAL CONFERENCE
KRASNOYARSK, RUSSIA
16-18 April 2020

MIP: Engineering-2020
Modernization, Innovations, Progress:
Advanced Technologies in Material Science,
Mechanical and Automation Engineering

Science and Technology City Hall
KRASNOYARSK, RUSSIA

«MIP: Engineering-2020: Modernization, Innovations, Progress: Advanced Technologies in Material Science, Mechanical and Automation Engineering»

«Mathematical model for changing the surface roughness of aluminum alloys when changing the final treatment modes»

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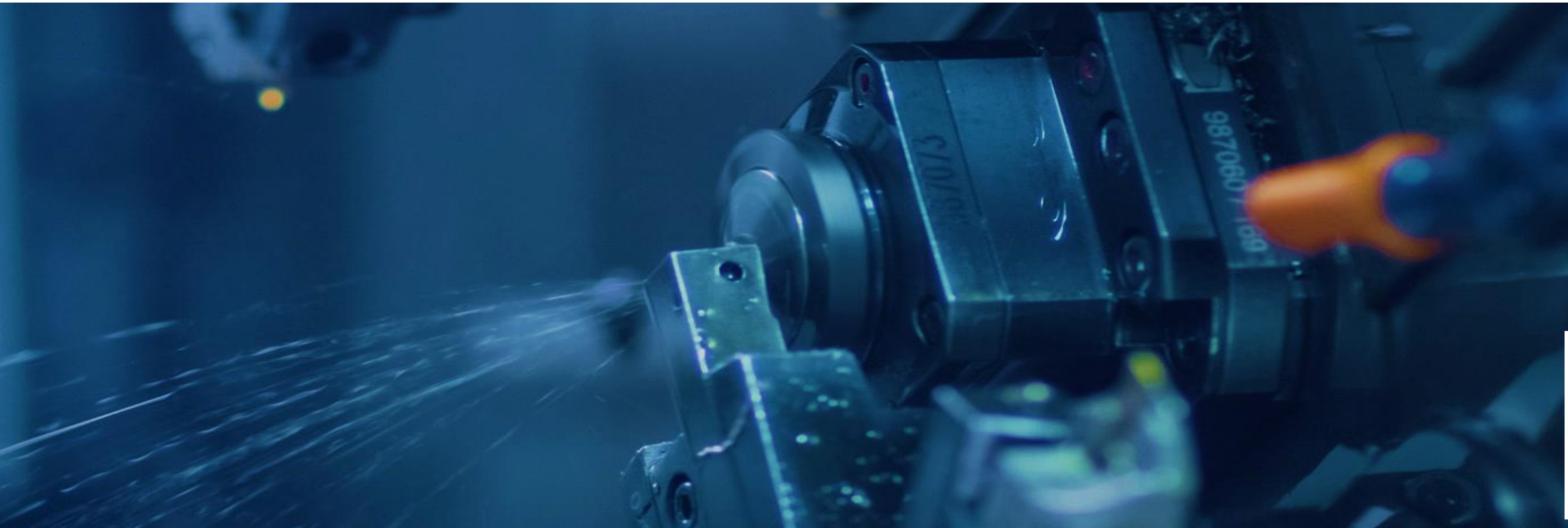
Problem statement

- Selection of optimal cutting modes for final transitions
- Development of an algorithm for selecting the solution method, response function, and the range of acceptable solutions at all stages of processing



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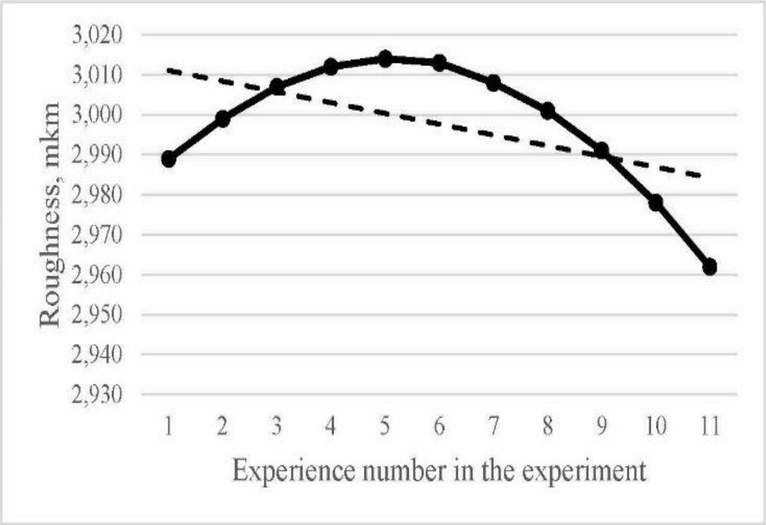
Solution methods

- Building a technique for extreme experiment planning
- Obtaining a mathematical model of the multi-factor process under study with incomplete knowledge of its optimization mechanism

The resulting regression equation:

$$Ra = 2,77 - 0,016v - 5,69s + 0,4t + 0,15vs.$$

v	s	t	$v{\cdot}s$	Ra (mkm)
80	0.215	0.500	17.20	2.989
82	0.210	0.525	17.22	2.999
84	0.205	0.550	17.22	3.007
86	0.200	0.575	17.20	3.012
88	0.195	0.600	17.16	3.014
90	0.190	0.625	17.10	3.013
92	0.185	0.650	17.02	3.008
94	0.180	0.675	16.92	3.001
96	0.175	0.700	16.80	2.991
98	0.170	0.725	16.66	2.978
100	0.165	0.750	16.50	2.962



Description of the local extremum region

Conclusions

Results, implementation

- The amount of surface roughness Ra in the final processing of an aluminum alloy is most influenced by the amount of feed s, and the degree of its influence is greater than the degree of influence of other factors.
- When the tool feed is reduced and the cutting speed and depth are increased, a local extreme area with maximum roughness is detected...

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