

Institute of Machine Tools and Manufacturing

Improving Geometric Calibration Methods for Multi-Axis Production Machines

Motivation

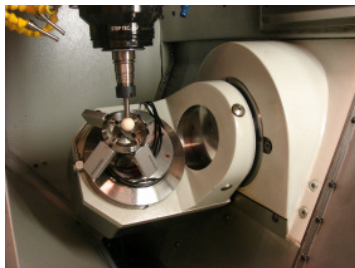
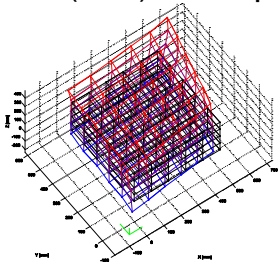
Today's state of the art in production machine testing and calibrating demands

- lot of time
- many measurement set ups with different measurement devices (e.g. laser interferometer with different optics or cross grid systems)

Objectives and Challenges

Determining and separating geometric errors of multi-axis production machines with reduced time and costs:

- 3D- ball plate: checking of component as well as orientation errors of linear axes and their interdependencies
 $U(k=2) < 4 \mu\text{m}$
- R- Test identification of single errors at 5-axis machine tools with quantification of the resulting uncertainty
 $U(k=2) < 2.8 \mu\text{m}$

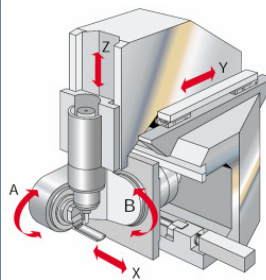


Applying Industry / Research

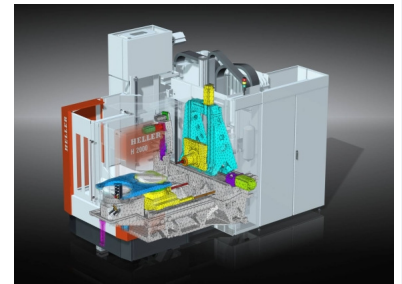
- Machine tool manufacturers and users
- Control manufacturers

Application Area

- Calibration of machining centers, turning centers and grinding centers
- Compensation of evaluated errors in the numerical control



(Quelle: StarragHeckert)



(Quelle: Gebr. Heller)

Conclusion and Outlook

Systematic planning and improving of calibration procedure

- Geometric behavior of machine tool after calibration can be predicted
- Methods can be applied to robots or parallel kinematics

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