

Measurement of Error motions on Five-axis Machine Tools by Ball Bar Tests

Abstract

The inclusion of the application of the double ball bar (DBB) measurement to the accuracy calibration of five-axis machine tools into the revision of ISO standards is currently under the discussion. This paper presents the modified DBB measurement device, referred to as “DBB5” in our study, where master balls are supported from the 45° direction to the spindle axis. It can perform all the circular tests on XY, YZ, and ZX planes without changing the setup. This paper first presents the parameterization of alignment errors and error motions of rotary axes in the five-axis kinematics. Experimental application of the DBB5 to the calibration of rotary axes error motions is then presented.