

Phumaret Sangram 2010: An Application of Ballbar for Six Joints Manipulator Positioning Error Compensation. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Mr. Chaikyakorn Jansuwan, Ph.D. 85 pages.

Ball-bar system is the tool for the CNC machine performance testing in circular motion. It can use to analyze many CNC machine errors components such as: squareness error, servo mismatch, backlash, machine vibration and roundness error.

This research is proposed the new method to apply 150 millimeter Ballbar compensate for the positioning error along circular path of the six joints industrial manipulator by neglected all dynamics effect of the manipulator. The manipulator positioning errors that deviated from the real position along circular path in  $XY$  plane with  $Z$  value constant are point to point measured with the average positioning errors and roundness along circular path is 0.091 millimeter and 338.69 micrometer, the compensation based on Robot Jacobian technique of the manipulator joints error are shown the average positioning errors and roundness along circular path in  $XY$  plane with  $Z$  value constant are reduced to -0.028 millimeter and 211.28 micrometer or 37.62% roundness increased. The result is shown the manipulator has increased accuracy and the Ballbar can be applied for the positioning error compensation in the manipulator. This study further strengthens the ability of Ballbar and can be applied to the industry.

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