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Abstract
Application of Servo System Control Network Technology to Synchronous Motion Control
The increasing demand for high speed and high accuracy in semiconductor and optoelectronics industries makes precise contouring very important in multi-axis motion control in their processing equipments and probe equipments. Moreover, the synchronization of multi-axis motion becomes more challenging in the presence of complicate mechanism.
Nowadays, pursuing real-time control is the trend even in high-level motion control applications. The state-of-art multi-axis servo control algorithm, though designed to deal with contour error, seldom considers the effect of asynchronous behavior in individual axis when execution command is issued sequentially. This results in contouring deviation as well.
Since servo system control network technology (SSCNET), developed by Mitsubishi, is capable of synchronizing all cascaded drivers simultaneously, the research makes use of this advantage and the state-of-art cross-coupled-control to achieve better contouring. Adlink’s SSCNET motion control card is used to issue SSCNET commands to Mitsubishi drivers. The synchronization is thus assured with the technique. Cross-coupled-control (CCC) using two axes’ feedback signals is employed to minimize the contouring error from nonlinear friction, lead error and other factors. With SSCNET technique, CCC is expected to reduce contour error ultimately. In this thesis, the synchronization experiment of two motors is done to verify the effectiveness of the proposed approach. It is predictable that the same technique will be popularly used to improving yields in the near future.
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