

## DESIGN OF TEST PLATFORM FOR INERTIAL SENSORS

### SUMMARY

The work involves the study, design and implementation of a hydraulic tracking servomechanism for specific control applications with particular emphasis to inertial sensors performance assessment. Such a servomechanism can be used as a turn table drive unit normally used to evaluate navigational systems. They are also very useful for robotic and machine tool applications.

The system used consists of a double stage servo valve, an axial multi-cylinder hydraulic motor (5 cylinders), and a hydraulic power pack. The feedback element was a twelve bit gray code absolute shaft encoder interfaced with an 8-bit computer system based on Z-80 microprocessor via its system bus using "PPI" controllers and latches which forms the 12-bit data acquisition part of the tracking control system. System timing was maintained using a Z-80 "CTC" controller. The computer system performs the control action on the above mentioned system via proper drive elements (power amplifiers and drivers).

The system was first modeled using both experimental and theoretical techniques. Then control algorithms were written in assembly language and applied to the system. The trajectory to be tracked by the servo was fed to the computer, then the computer controls the operation of the hydraulic motor by following the input trajectory using data obtained from the feedback transducer.

Proportional and proportional plus integral types of control algorithms were used. Optimal controller parameters were computed using Hooke-Jeeves method where initial settings were determined