KCL - 07
RELAY CONTROL SYSTEM TRAINER

Most physical systems are nonlinear to some extent, however, for purpose of analysis and design these are taken as nearly linear. In a few systems nonlinear elements are deliberately introduced to get some specific advantage. One such system is a relay control system, often referred to as bang-bang or ON-OFF system. The controller in such a system is replaced by a power relay resulting in a substantial cost reduction. In the present unit a simulated second order system is controlled by an electronic relay. Apart from a study of the relay characteristics the experiment introduces the concept of Describing Function. Finally the phase plane method of analysis is covered in detail where the switching trajectories can be displayed on an X-Y oscilloscope. Figures below give the block diagram of the feedback system and the characteristics of the simulated relay.

The accompanying literature covers a brief treatment of the nonlinear system analysis through Describing Function and Phase Plane methods. Steps for conducting various experiments are described along with sample test results.

Features

- Simulated electronic relay using high speed IC's.
- Simulated 2nd order linear plant. Facility for displaying x and x signaling.
- Dead zone variable from 0-600mV.
- Hysteresis variable from 0-500m.
- Built-in Signal source- Sine and Square Amplitude: 0-1V (min) Variable Frequency: 10, 20, 40, 80, 100, 200, 400, 800 and 1000Hz.
- **Interconnections**
  - All interconnections are made using 2mm banana Patch cords.
- Test points are provided to analyze signals at various points.
- All ICS are mounted on IC Sockets.
- Bare board Tested Glass Epoxy SMOBC PCB is used.
- In-Built Power Supply with Power ON indication
- Attractive ABS Plastic enclosures.
- Set of 2mm Patch cords for inter-connections.
- User's Manual

List of Experiment.

- Study of the relay characteristic and display of the same on CRO for different values of hysteresis and dead zones.
- Study of the effect of hysteresis on system stability. Graphical analysis to predict sustained oscillations.
- Phase plane analysis of relay control system for various values of Hysteresis and Dead Zones. View the trajectory for different hysteresis and dead zone.

Note : Specifications can be altered without notice in our constant efforts for improvement.