



Figure 4.7: Comparison of PID response for Relay, ZN and TL, by simulation.

4.3.1 ISE of response for these three methods:

ISE decide whether which controller parametric value is better from their output responses.

Table 4.4: PID parameters for Relay-tuning, Z-N and T-L methods by simulation,

	Relay-Tuning	Zeigler-Nichols	Tyreus-Luyben
ISE	0.707	0.8621	0.9023

Above table 4.4 is shows the values of ISE for different controller parametric values calculated by different three methods. Here also ISE for Relay-Tuning method is less than other two methods. Hence it is finally concluded that, even if these methods gives different responses for other systems (found in literature), these methods are giving similar but better controller responses. So these methods can be used more preferably for the design of single tank water level system.

5. Conclusion and Future Scope

Feedback Coupled Tanks System is used for the experimental verification of designed controllers. The system is found to be very simple to operate and it is a digital control system which works on MATLAB / Simulink platform. The system can be used with different configurations which would have industrial applications. Two approaches, theoretical and practical, are used for the modelling of system. It is found that theoretically designed model used for controller design is giving best performance. So it can be used for controller design of single tank system and it is needed to improve the experimental model identification method.

Controller design on the basis of critical frequency data i.e. ultimate gain and ultimate period of systems are studied by using Relay auto-tuner. It is observed that Relay is giving best response for this system. In this project work, Relay-Auto-tuning, Ziegler-Nichols and Tyreus-Luyben, Methods of PID controller design are studied. After Real-time verification and calculated ISE value for these three methods, it is observed that these all methods are giving best controller performances. Hence it is concluded that all these methods can be used for controller design of single tank system but out these three methods Relay is giving best response for controller design of single tank system.

The Coupled Tanks System can be studied with different configurations. This is a digital control system. There are four tanks coupled with each other and two pumps inlet are provided. So there is a lot of scope to work on this system using other methods of controller design and by changing configurations.

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