

Amol A. Shinde, Micro-controller based balanced multi-phase signal generation and sequence detection System, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 2005.

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Abstract - Various methods for sequence detection of 3-phase systems are critically reviewed. However they cannot be extended to multi-phase systems. A new technique for detecting the phase sequence of any balanced multi-phase system is proposed and practically tested. To verify the operation of the multi-phase sequence detector a multi-phase supply is needed. Some techniques of multi-phase generation are reviewed and a new multi-phase generator using hysteresis circuits is proposed. It is shown that there can be four possible types of hysteresis characteristics. Their properties are depicted. Two of them are well-known but the other two are not common. Circuit realizations of the latter two types of characteristics are presented. A multi-phase generator is a typical application which involves the use of all the four types of hysteresis circuits. It is shown how the system can be programmed to generate any number of phases. The implementation shows how the design is optimized for total number of opamps. Simulated and measured results verify the theoretical predictions.