

## Model Based Fault Diagnostic Approach for Limit Switches

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**Abstract :** The degree of freedom relates to our capability to observe or model the energy paths within the system. Higher the number of energy paths being modeled leaves to us a higher degree of freedom, but increasing the time and modeling complexity rendering it useless for today's world's need for minimum time to market. Since the number of residuals that can be uniquely isolated are dependent on the number of independent outputs of the system, increasing the number of sensors required. The examples of discrete position sensors that may be used to form an array include limit switches, Hall effect sensors, optical sensors, magnetic sensors, etc. Their mechanical design can usually be tailored to fit in the transitional path of an STME in a variety of mechanical configurations. The case studies into multi-sensor system were carried out and actual data from sensors is used to test this generic framework. It is being investigated, how the proper modeling of limit switches as timing sensors, could lead to unified and neutral residual space while keeping the implementation cost reasonably low.

**Keywords :** low-cost limit sensors, fault diagnostics, Single Throw Mechanical Equipment (STME), parameter estimation, parity-space

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