

# **Abstract**

**Mostafa Ahmed Abdel Galil**

## **Reliable Fault tolerant system design based on Dynamic safety margin**

Dynamic safety margin (DSM) is a new performance index used to measure the distance between a predefined safety boundary in the state space and the system trajectory as it evolves. Controller design based on DSM is important to maintain a predefined margin of safety during the transient and in the presence of large disturbances particularly in safety-critical systems. Moreover, Designing a Fault Tolerant Control (FTC) system based on DSM is important to operate the system at an acceptable performance in addition to maintain a safe operation margin during the fault period. Some methods of implement DSM in controller design and adaptation are introduced in this work mainly, PID and MPC controllers. Moreover, a framework of FTC system based on DSM is introduced