Theme and objective:

Modern systems tend to be more complicated than ever before, facilitated by novel design concepts and advancements in new technologies such as sensing, material, communication, and systems (or functions) integrity. Risk, reliability, and availability investigations are to find the most feasible, economical, and easy-to-follow solutions for complex systems with the assistance of recent emerged techniques.

However, risk, reliability, and availability investigations for complex systems are hard when considering system complexity, new technologies introduced, new system and appendant elements configuration, and so forth. The existing concepts, ideas, models, methodologies, and tools constructed based on the operational features of traditional or simple systems and equipment can hardly be applied to the newly emerged systems. For instance, electromagnetic radiation reduces the reliability of generators, harsh sea conditions introduce additional unsafe factors to offshore energy facilities, vibrations and extreme operational temperature cycles weaken the resistance of electrical and tiny mechanical elements of energy production systems.

Hence, there is a surging demand to converge the state-of-the-art solutions on the above aspects and provide feasible thinking to guide performance improvement and profit increase of today’s systems especially those subjected to uncertain environmental and operational factors. To this end, this special session presents original research papers dealing with newly emerged risk, reliability, and availability models to provide academia with innovative ideas and engineering with the most recent interesting applications.

Field:

Potential topics include but are not limited to the following:

1. Structural integrity analysis of mechanical and offshore structures.

2. Mathematical models for structural failures, including fatigue, corrosion, and degradation.

3. Reliability, availability, maintainability modelling, and verification methods.

4. Mathematical models for condition monitoring and fault diagnostics and prognostics.

5. Mathematical and numerical models for system control and failure prevention.

6. Remaining useful life prediction of machinery and structures.