Defence Seminar	
Seminar Title	: Robust Online Model Order Detection of Low Frequency Oscillatory Modes in Power System for Wide Area Monitoring System
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Abstract	: In order to meet the growing power demand and concerns about climate change, the integrated Microgrid and Distributed Energy Systems (MDES) with the power system has become increasingly prevalent. While linking MDES to large-scale grids can enhance the economic efficiency of power grid, it also introduces technical challenges by changing thedamping performance of grid. This alternation may give rise to Low Frequency Oscillations (LFOs), posing a threat to grid stability in certain situations. So, it becomes crucial to detect such modes of LFOs online to implement corrective measures to maintain system stability. The development of Wide Area Monitoring Systems (WAMSs) based on Phasor Measurement Units (PMUs) has made it possible to monitor the small signal rotor angle stability online by accessing real-time power system measurements at the control center. The primary objective of the current thesis is to deal with a few issues related to the online mode estimation of LFOS for ringdown and ambient data in power systems. For mode estimation techniques have been developed to characterize these modes based on their dominance in the signal, which requires prior knowledge about the signal&rsquos Model Order (MO). So, the key contribution of this work is to develop a robust MO estimation technique, which will work efficiently in all ranges of signal and noise levels. So, in this proposed work, an unsupervised sequential K-Mean++ clustering technique is implemented for the estimation of model order of low-frequency PMU data by separating the significant eigenvalues of Autocorrelation Matrix (ACM) iteratively into signal and noise subspace. This two-layer K-Means++ algorithm promises a valid estimation of model order so that the insignificant eigenvalues and horider of total cast Square Estimation of Signal Parameters via Rotational Invariance Techniques (TLS-ESPRIT) for the estimation of modes. To validate the efficiency and robustness of the proposed method, a comparative study is carried out with the other recently