The paper rather aptly entitled "SVD-Based Voltage Stability Assessment From Phasor Measurement Unit Data" is an elucidation on the challenges faced when attempting to model the vulnerability of Power systems to voltage instability when taking into account large-scale power outages. Following the description of the problem, the paper discusses specific drawbacks of the current method (the state estimator that uses a network model for steady states' computation) of measuring voltage instability. These include a reliance on knowledge of the network parameters, relevant topology, and its infrequent update rate among others. Having demonstrated the necessity for an alternative method, the paper introduces a new avenue (PMU-based metrics of system performance) negates the aforementioned issues while taking advantage of newly improved measurement technology. It is then that we segue into what is the crux of the investigation by mentioning a new metric, to indicate power flow conditioning, that is based on the the SVD (Singular Value Decomposition).

Naturally, to implement such a method, one has to begin with its grounds in theory, before adjusting said logic to something more suitable for large-scale practical use. As such, any such idea will rest on certain *assumptions*, where it is only logically sound provided these are true. In this case, our idea depends on a few pivotal ones. One of the most salient ones is that our PMU systems are capable of full measurement data at all buses. Naturally, such a thing would not be feasible due to sheer size of the US and consequently, the sheer complexity of the power systems that run throughout the country. Another such assumption is the more implicit one of the obtained readings of operating point sufficiently depicting linearized, "small-signal" behavior. This can only be done by specifically verifying that our parameters (namely the PMU data matrix's window length and the time between reporting samples) sufficiently allow for data to follow our assumption.

Considering the problem the authors are attempting to solve by using the PMU-based metrics of system performance, it is clear that there is a need for a more clear-cut means of quantifying this method. As such, we begin by realizing that the inverse of the power flow Jacobian matrix must be calculated. This is due to the fact that it exemplifies the sensitivity of the power system to any load changes (voltage stability). As such, the SVD plays a pivotal role in this as it is responsible for computing the inverse of the Jacobian with high efficiency. This is especially important particularly in large dimensional matrices, such as the ones that would undoubtedly be used in this case. By definition, the matrix is decomposed into the SVD form U, S, and V^T, where U and S are orthogonal matrices, while V is a diagonal matrix containing the singular values in question. This is more clearly depicted in the following formulae, that formally defines the SVD and its application in this context. Please note that there are other significant reasons for the SVD's usage in this method, such as computing the largest singular values per bus and clearer indicators of voltage stability.

$$A = USV^T \tag{1}$$

$$A^{-1} = VS^{-1}U^T = \sum_{i=1}^{n} \frac{u_i^T v_i}{s_{ii}} \tag{2}$$

To conclude, the paper's suggested algorithm uses an empirical method (PMU system measurements) rather than a model to make accurate and efficient voltage stability assessments in real-time. It briefly describes other future avenues of the algorithm's usage, such as further optimizing the SVD computation for large datasets and detecting topology changes in the power system.