Monitoring voltage stability across several transmission lines using phasor measurements.

Frequently power systems are exposed to large transfers of power between areas, which can produce voltage stability problems and blackout. For this reason, is desirable to be able to monitor voltage stability online with phasor measurements to give operators a fast indication

of voltage stability problems that is independent of state estimation.

Current methods of voltage stability monitoring with phasor measurements work for load supplied by a radial corridor, whereas many practical situations involve load supplied by multiple corridors. Thus, I propose how to reduce multiple corridors to an equivalent radial corridor, including the variation of all loads that are connected to the corridor, so that the margin to voltage collapse can be monitored with phasor measurements in these multiple corridors.

In this thesis, I present three approaches of how to reduce multiple lines to an equivalent radial line so that the margin to voltage collapse can be monitored with PMUs. In addition, I include in this methodology the reactive power limits of the generators. Furthermore, I tested these methods with satisfactory results, and selected for further development the most promising method for online voltage stability assessment between areas.