

Integration of DigSILENT/Power Factory and Matlab/Simulink for Microgrid Analysis

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Abstract

Integrated simulation approach of DigSILENT/Power Factory and MATLAB/SIMULINK expands strengths of each simulation platform to meet the requirements of future networks like smart microgrids.

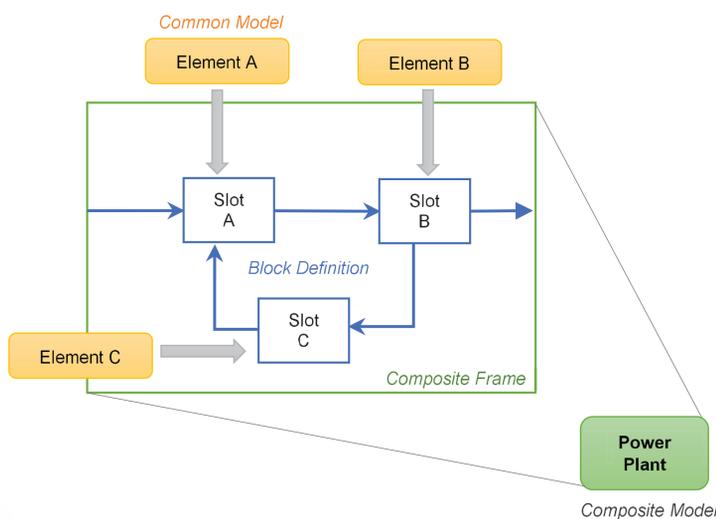
Objectives

- To provide an overview of Power Factory capabilities in terms of both steady state and transient state of microgrids,
- To integrate MATLAB/SIMULINK with Power Factory,
- To verify the integration through various case studies.

Methodology

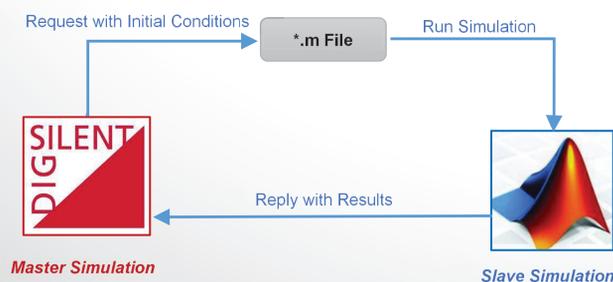
In order to verify the accuracy and convergence of Power Factory, IEEE benchmark systems with high level of unbalance are used to test steady state analysis.

For stability studies, DigSILENT Simulation Language is utilised with built-in models and with Simulink embedded models.

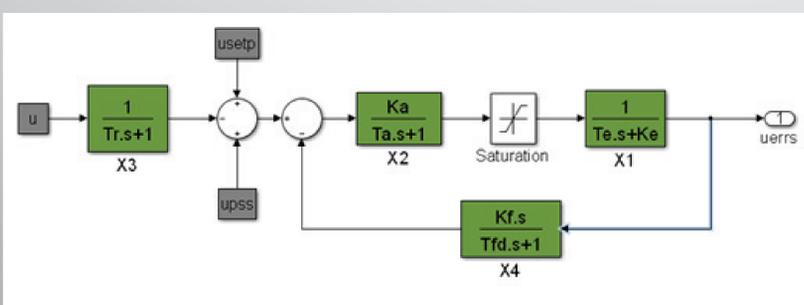


Simulations

Matlab *.m file plays a role of coordinator between Power Factory and Simulink

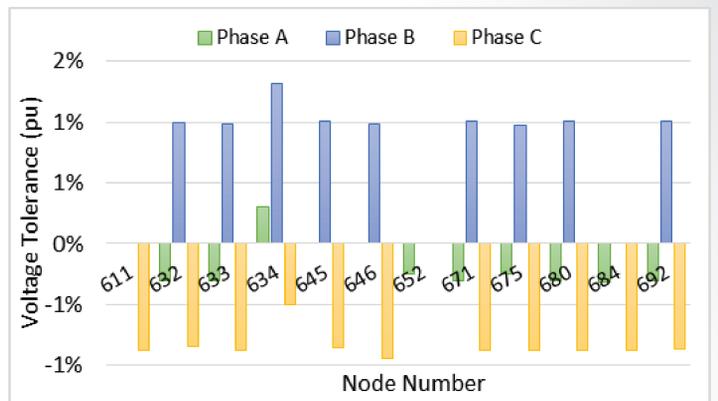


An IEEE excitation system is developed by Simulink and inserted to Power Factory to compare with its built-in model.

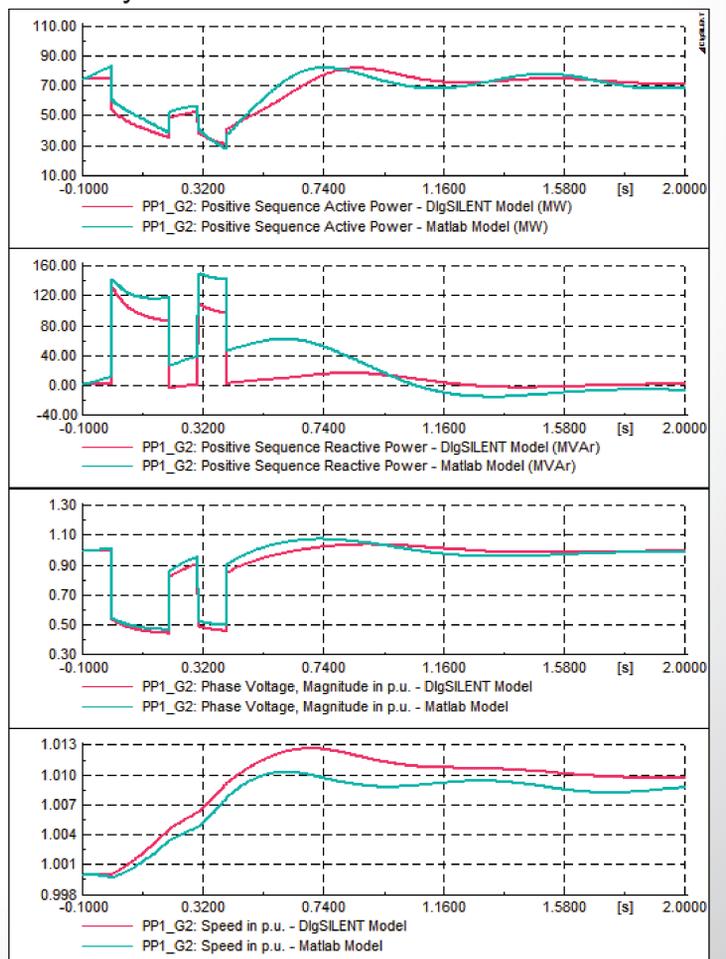


Results

High accuracy obtained from Power Factory compared to IEEE published results for steady state analysis.



Dynamic response of the system using built-in and Simulink embedded voltage regulator is relatively similar.



Conclusion

Remarkable performance of Power Factory is proven via both steady state and transient state analysis of microgrid.

Smooth immigration of Simulink model to Power Factory with nearly identical response confirms that integration of two simulation platforms is feasible;

Overall, a promising methodology for microgrid analysis is developed.