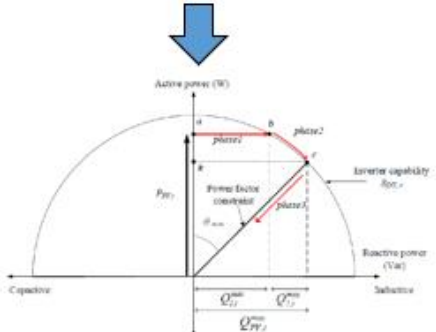
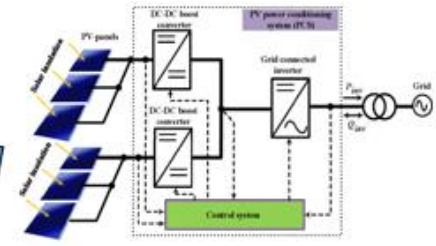
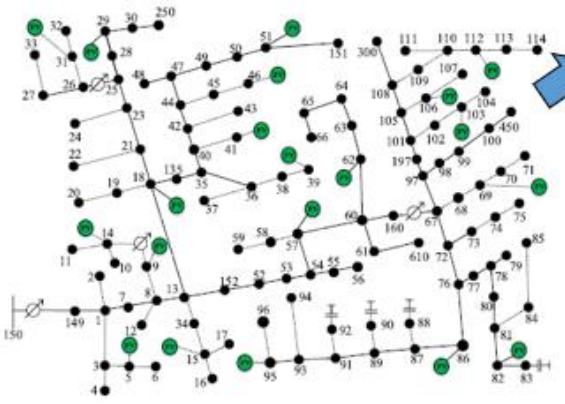
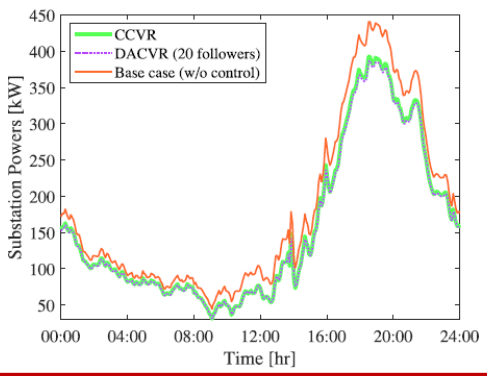


# Grid integration of distributed renewable energy: Volt/Var control with high penetration of solar PV generations

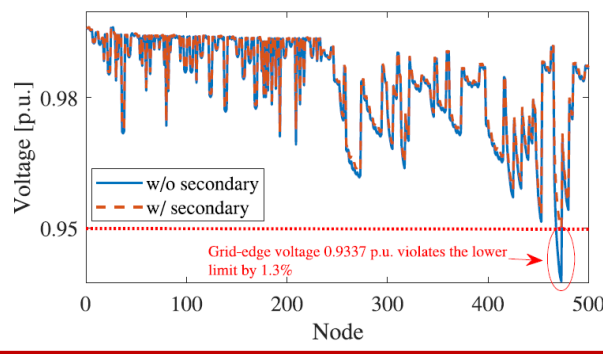
- Coordination between voltage regulation devices and PV smart inverters
- Real-time volt/var control
- IEEE 1547-2018 Standard



- Conservation voltage reduction

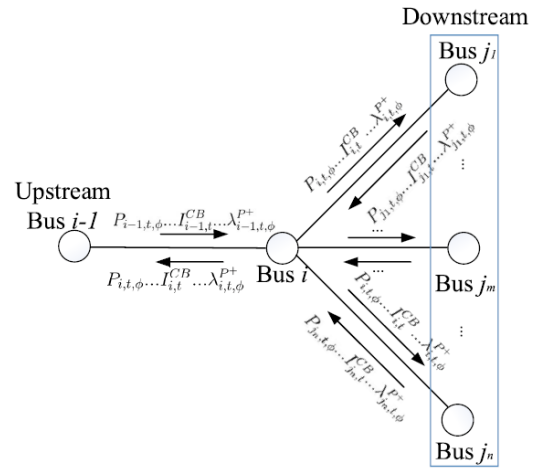


- Regulate grid-edge voltage

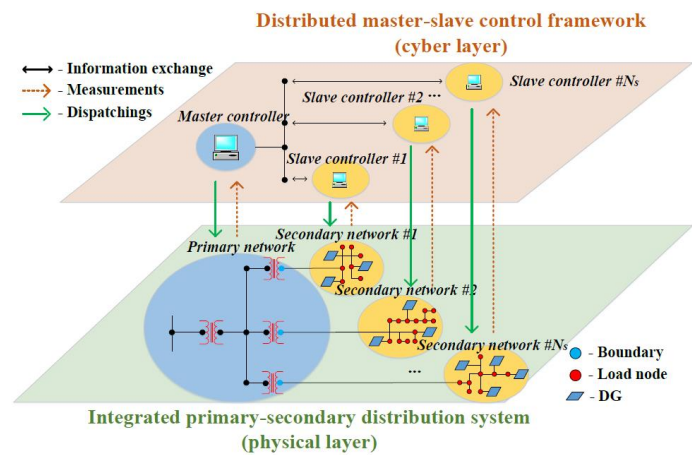


- ADMM-based distributed control method: decompose large-scale problem, exchange information, privacy

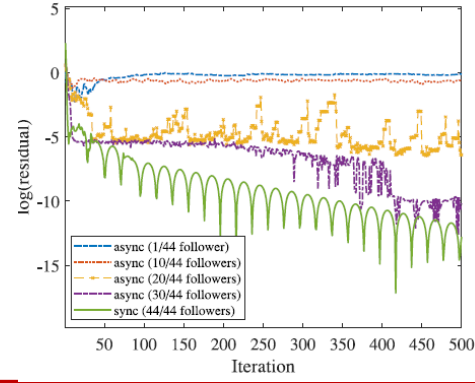
- Bus-level distributed control



- Network-level distributed control



- Q. Zhang, K. Dehghanpour and Z. Wang, "Distributed CVR in Unbalanced Distribution Systems With PV Penetration," in IEEE Transactions on Smart Grid, vol. 10, no. 5, pp. 5308-5319, Sept. 2019.
- Q. Zhang, Y. Guo, Z. Wang and F. Bu, "Distributed optimal conservation voltage reduction in integrated primary-secondary distribution systems," IEEE Trans. Smart Grid, vol. 12, no. 5, pp. 3889-3900, Sept. 2021.



- Online and asynchronous implementations
- Robust against non-uniform update rates and communication delays
- Make our application more suitable for real-world applications