Typical ADMM consensus problem:

Want to solve in a decentralized way.

Simplified formulation since :

Centralized WLS state estimation (non-convex function since h(x) is nonlinear, Gauss-Newton doesn’t guarantee convergence – not even local convergence like in Newton’s method):

Decentralized WLS state estimation using ADMM for partition *i* (non-convex for which ADMM does not guarantee convergence):

Recall:

Back to the decentralized WLS formulation:

Using the Gauss-Newton method, expand the nonlinear function into its Taylor series around , neglecting the higher-order terms.

Neglecting the second-derivative terms,

Polar AC power flow:

Rectangular AC power flow: