Implement LUSOL in Solving Power Flow Equations

Zack
10/18/2013
LUSOL

- LU factorization

- Replace a row/column in matrix A, and update LU factorization

- Add a rank-1 matrix into matrix A, and update LU factorization
Strategies to Solve Power Flow Equations

• Newton Raphson Method (NR)

• Fast AC.
• Mixture of Newton Raphson & Fast AC. (MIX)
  • At early iterations, do not change Jacobian matrix.
  • After some iterations, update full Jacobian matrix, and follow NR method.

• Fixed MIX
  • At early iterations, update several rows of Jacobian matrix (LUSOL*)
  • After some iterations, update full Jacobian matrix, and follow NR method.

• My_algorithm
  • Always update several rows of Jacobian matrix
• LUSOL need an initialization time ~ 25ms
• MIX performs better than NR when number of buses is bigger than 1000
• MIX is not converged in Case300
- MIX can not touch the “switch rule”
- Fixed MIX can get to “switch rule” at 4th iteration.
- My_algorithm performs well in this case, converged at 7th iteration. But normally, it will need same iterations with quick power flow method.
Thank you