Lecture 26. 18 November 2004

- **Review of Lecture #25:**
  - Inaccurate line search. Armijo’s rule.
  - Properties of the gradient. Scaling of design variables.
  - Newton’s and modified Newton’s methods. Drawbacks of Newton’s method.

- **Quasi-Newton methods - A general algorithm**
- Quasi-Newton condition - inverse and direct forms.
- Rank one update - direct and inverse forms; positive definiteness; quadratic function.

**Rank two updates:**
- BFGS direct update - slightly different forms; positive definiteness. Updating of Cholesky factors.
- DFP update for the inverse - complementary to BFGS direct update.
- Inverse update based on Sherman-Morrison formula.
- Product form of the inverse update.

- **Quasi-Newton methods - Summary**

- **Conjugate Gradient Method.** CG for quadratic problems: define conjugate directions; give Hestenes-Stiefel algorithm and discuss its properties; present derivation of the method.