Optimisation 1, Lecture 15

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Previous lecture

- Augmented Lagrangian method for equality constraints:

$$x_{k+1} = \arg\min_x \left[f(x) - \langle \vec{\lambda}_k, \vec{c}(x) \rangle + \frac{\mu}{2} \|\vec{c}(x)\|^2 \right],$$
$$\vec{\lambda}_{k+1} = \vec{\lambda}_k - \mu \vec{c}(x_{k+1}).$$

- Quadratic penalty method for inequality constraints:

$$Q(x, \mu) := f(x) + \frac{\mu}{2} \sum_{i \in \mathcal{I}} (c_i^-)(x)^2 \to \min.$$

- Logarithmic barrier method:

$$B(x, \beta) := f(x) - \beta \sum_{i \in \mathcal{I}} \ln(c_i(x)) \to \min.$$

Goals for today's lecture

- Idea of Quasi-Newton methods.
- Symmetric rank 1 (SR1) method.
- (Quasi-Newton methods for large problems.)