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### 0.1 Multiple equality constraints

#### 0.1.1 Solving the Langrangian with many constraints

This time we have:

$$\mathcal{L}_{x_i} = \frac{\delta f}{\delta x_i} - \sum_k^m \lambda_k \frac{\delta g_k}{\delta x_i} = 0$$

$$\mathcal{L}_{x_j} = \frac{\delta f}{\delta x_j} - \sum_k^m \lambda_k \frac{\delta g_k}{\delta x_j} = 0$$

$$\frac{\delta f}{\delta x_i} - \sum_k^m \lambda_k \frac{\delta g_k}{\delta x_i} = \frac{\delta f}{\delta x_j} - \sum_k^m \lambda_k \frac{\delta g_k}{\delta x_j}$$