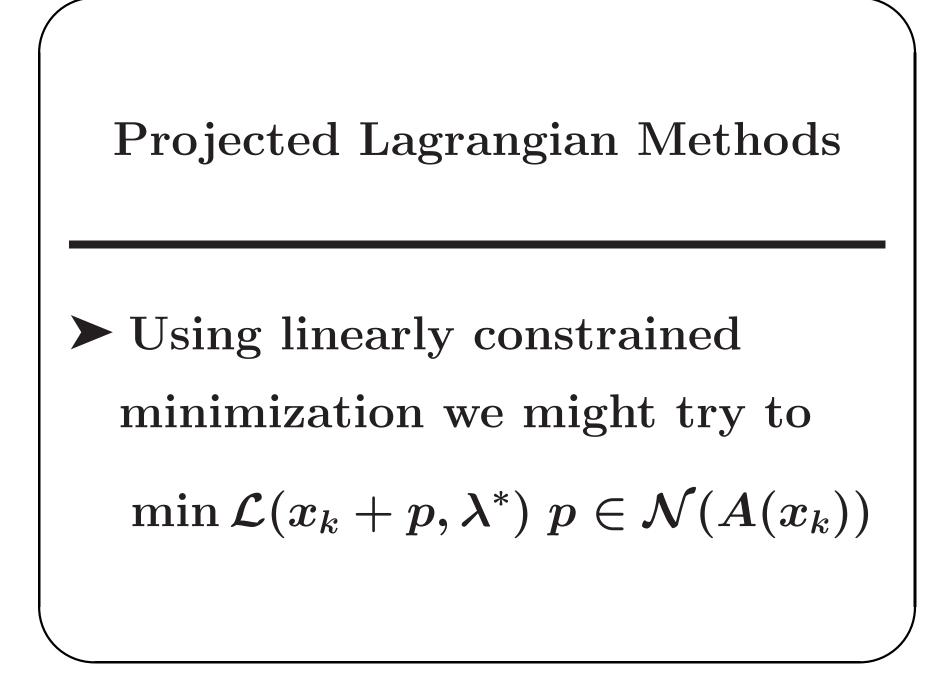
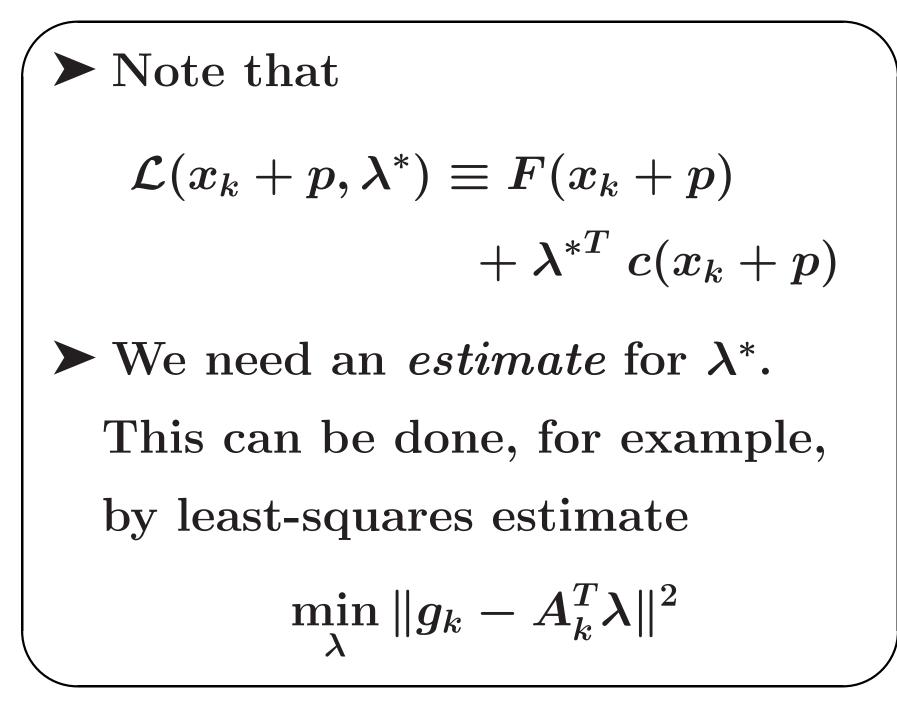
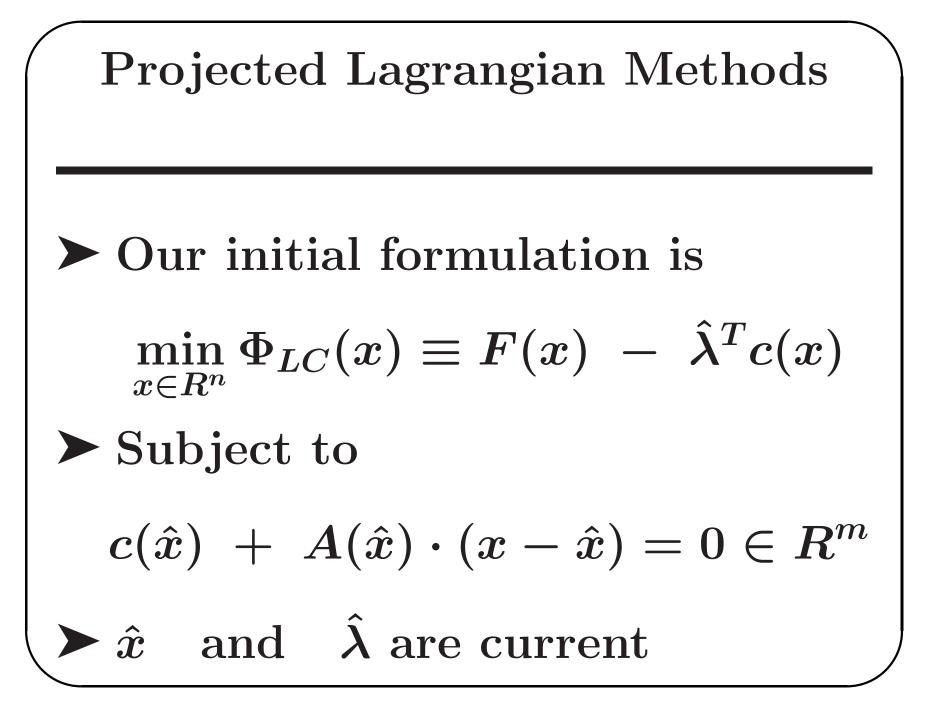


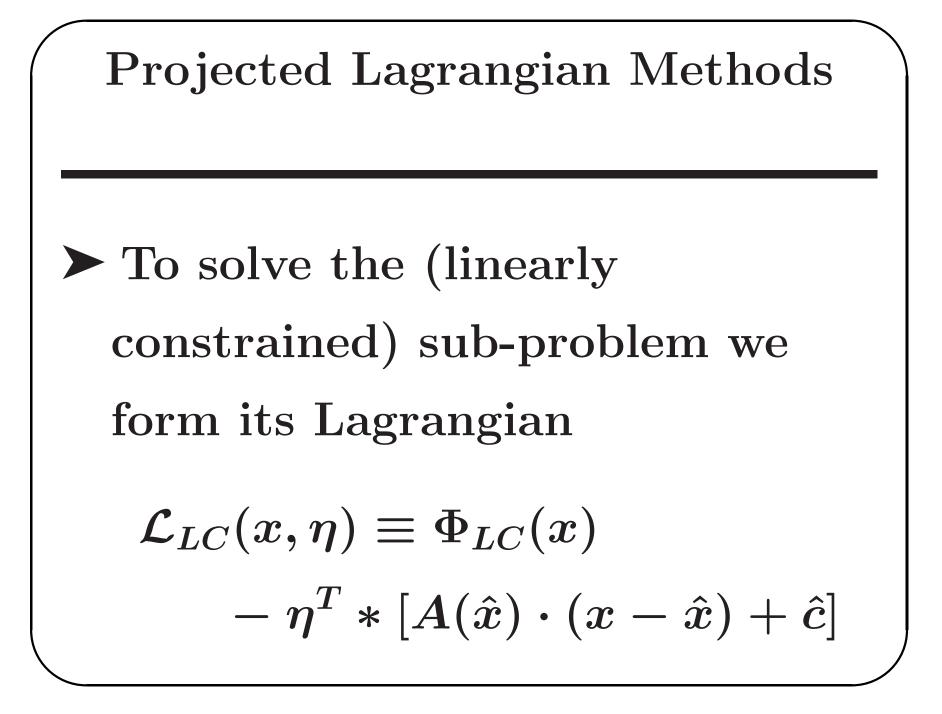
that (x^*, λ^*) minimizes $\mathcal{L}_A(x,\lambda^*,
ho)$ for all $\rho > \bar{\rho}$. ► Also known as the *Method of* Multipliers (Hestenes)

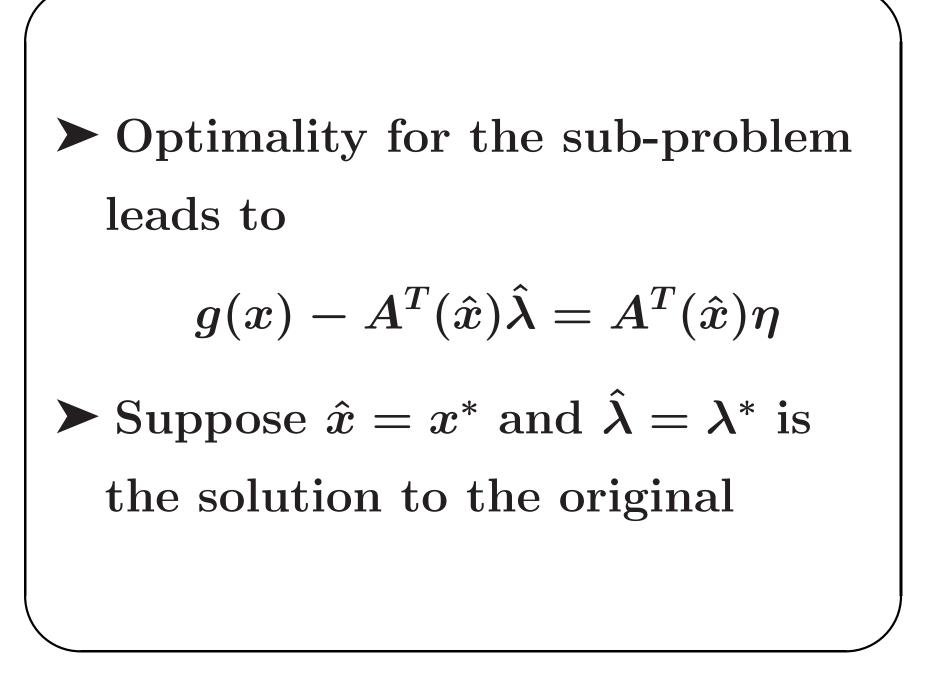




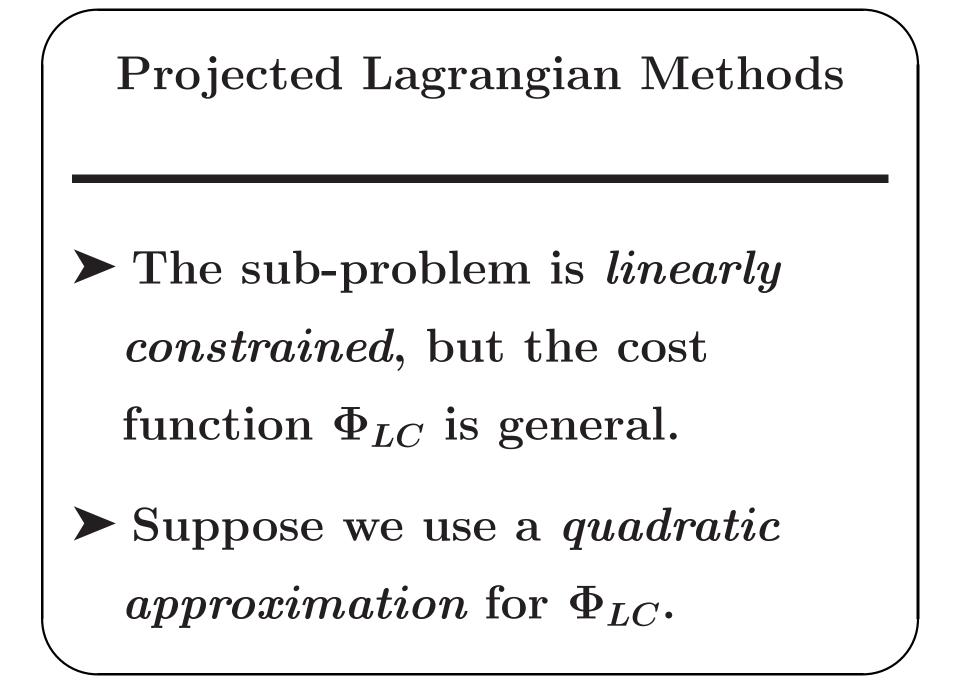


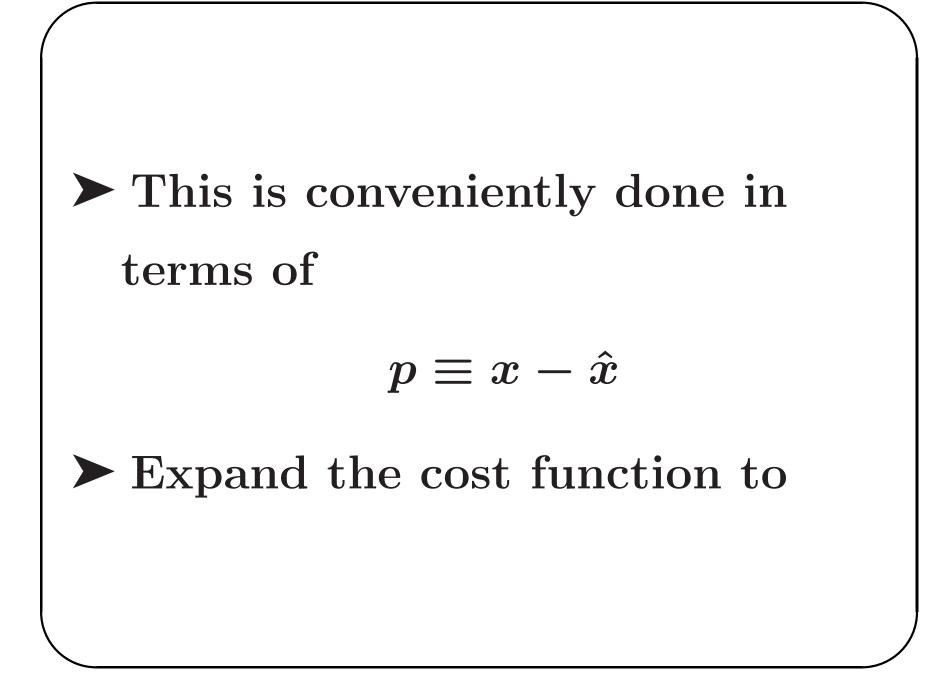
estimates of the solution of our original problem





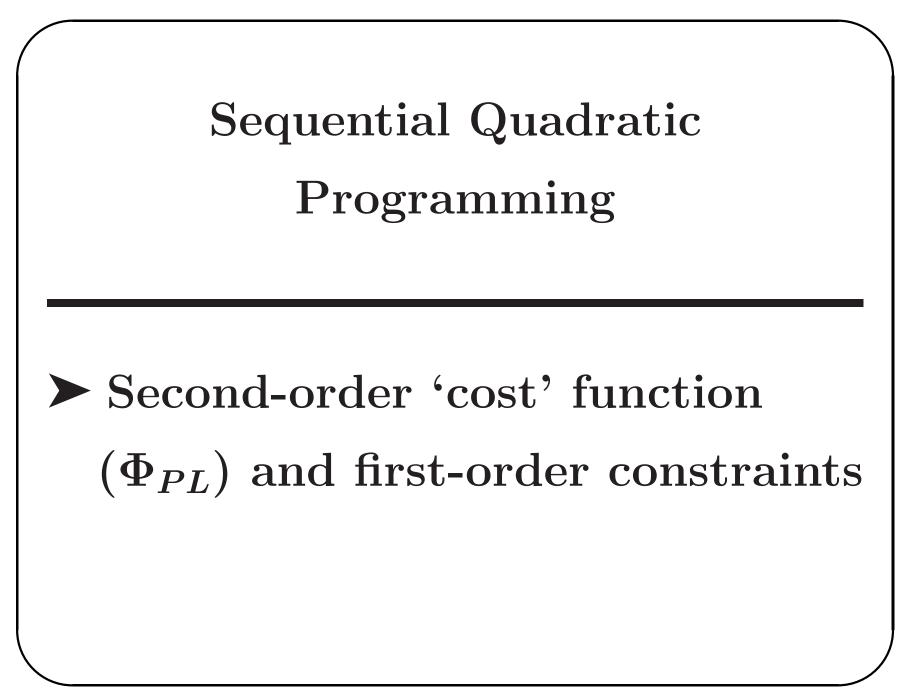
problem - then $g(x^*) - A^T(x^*)\lambda^* = A^T(x^*)\eta$ $ightarrow\eta=0\in R^m$ This suggests that we modify our sub-problem $\Phi_{LC}(x) \equiv F(x) - \hat{\lambda}^T c(x)$ $+\,\hat{\lambda}^{T}\left[A(\hat{x})(x-\hat{x})
ight]$

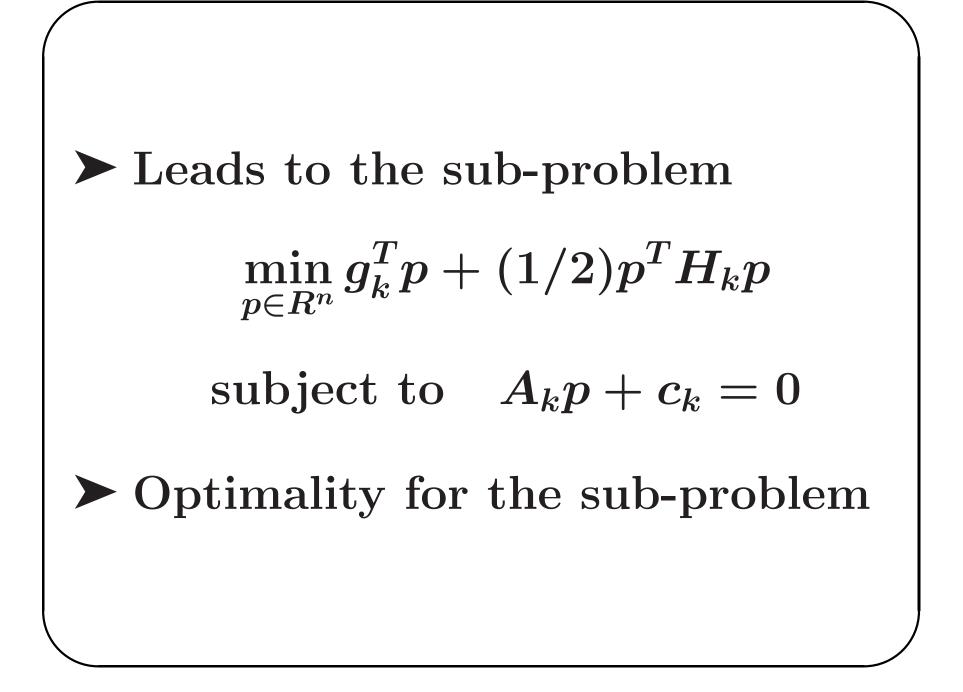




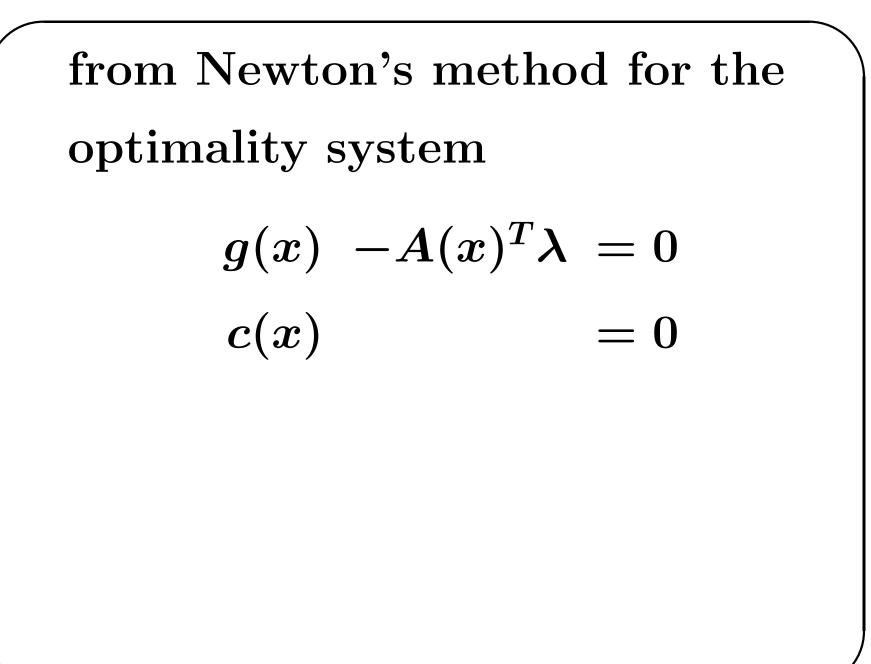
second-order $\Phi_{LC}(\hat{x}+p) \approx \Phi_{LC}(\hat{x})$ $+\left[rac{\partial \Phi_{LC}}{\partial x}
ight]_{\hat{x}}^{T}p$ $+ (1/2) p^T igg[rac{\partial^2 \Phi_{LC}}{\partial x^2} igg]_{\hat{x}}^T p$

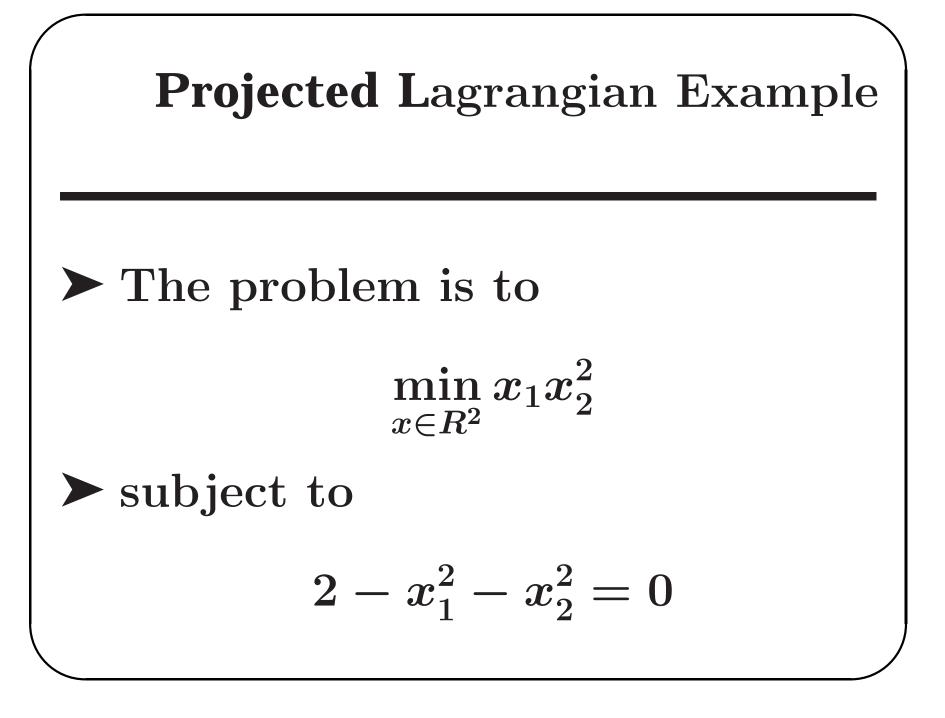
This leads to $\Phi_{LC}(\hat{x}+p) pprox \Phi_{LC}(\hat{x})$ $+g(\hat{x})^T p$ $+ \, (1/2) p^T igg[rac{\partial^2 \mathcal{L}}{\partial x^2} igg]^T_{(\hat{x},\hat{\lambda})} p^T$

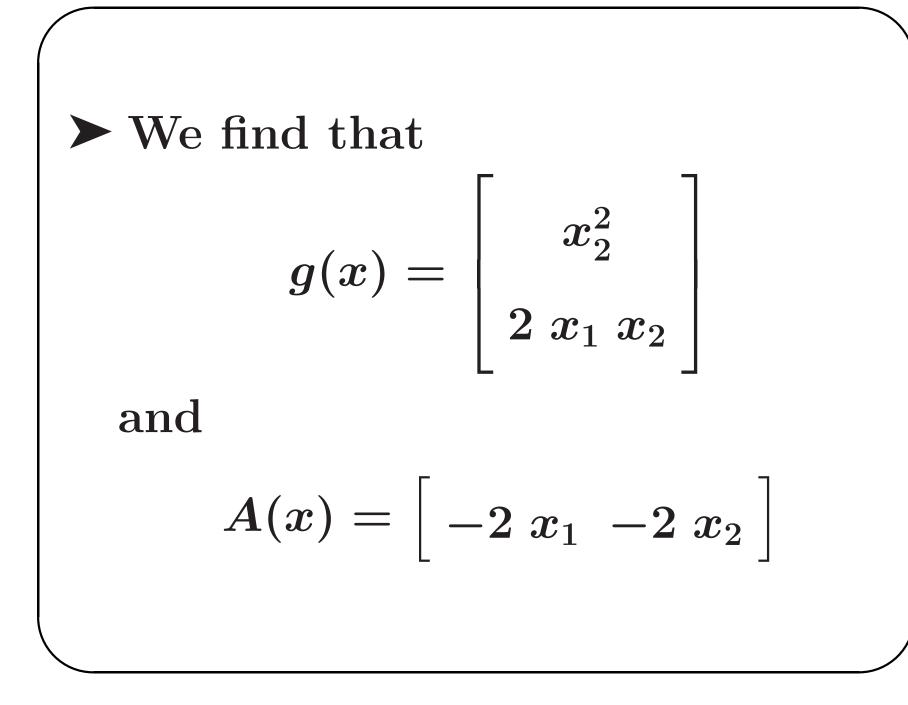


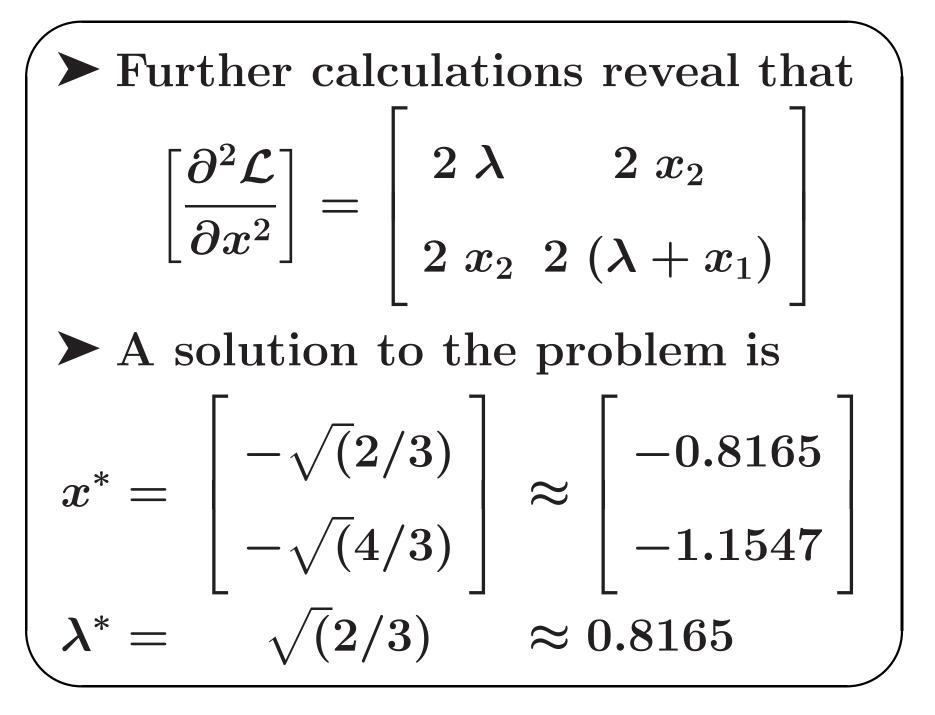


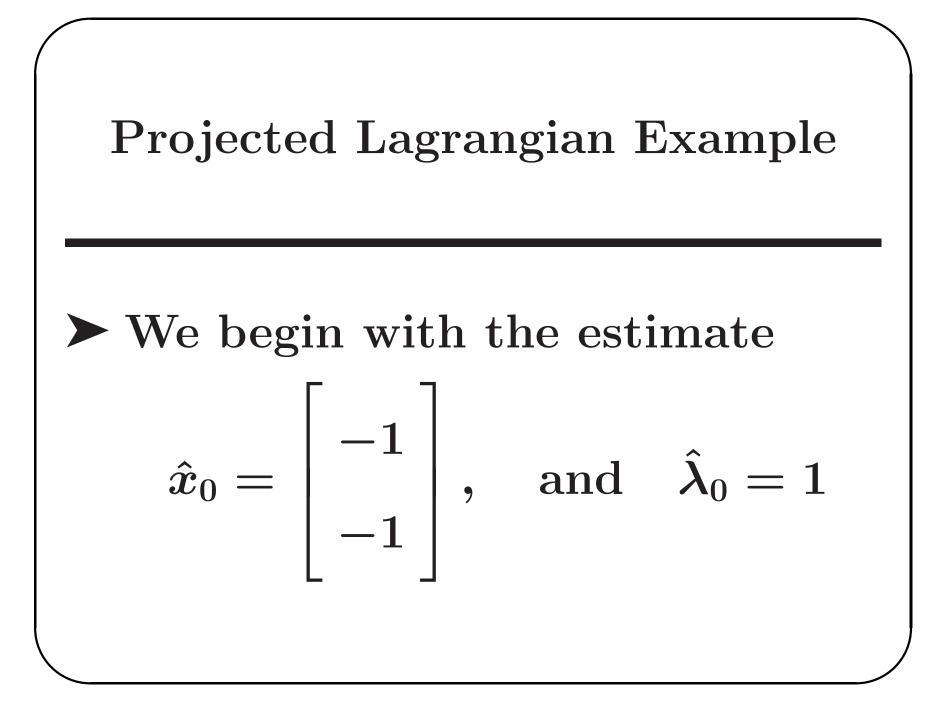
leads to: $egin{bmatrix} H_k & -A_k^T \ A_k & 0 \end{bmatrix} egin{pmatrix} p_k \ \eta_k \end{pmatrix} = egin{pmatrix} -g_k \ -c_k \end{pmatrix}$ \blacktriangleright Note g_k is the gradient of F and H_k is the estimate of the Hessian of the Lagrangian ► Related linear system arises







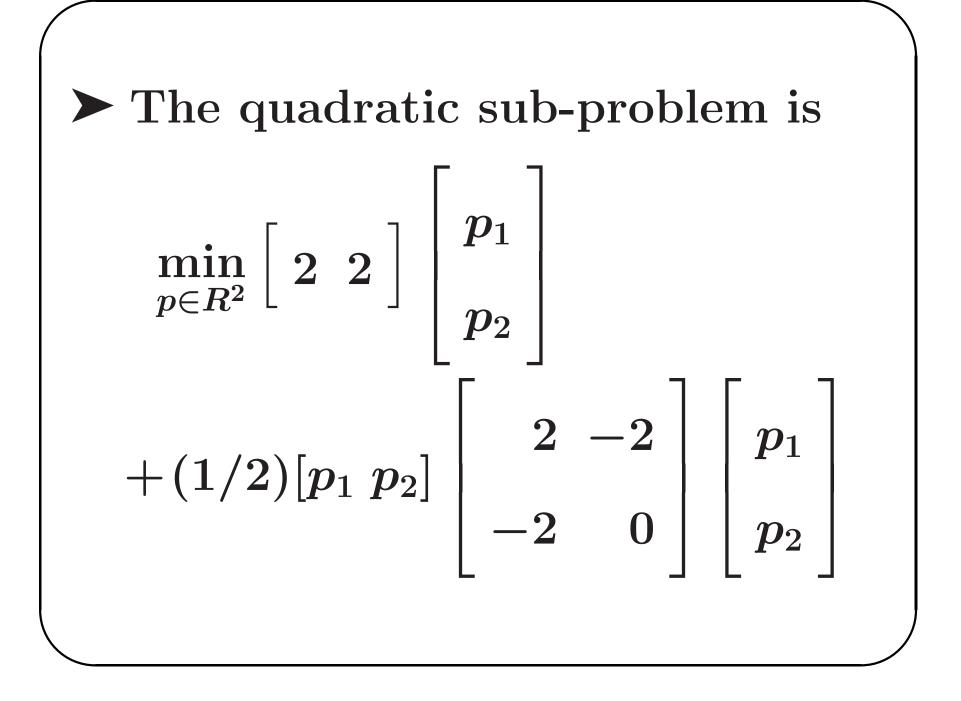


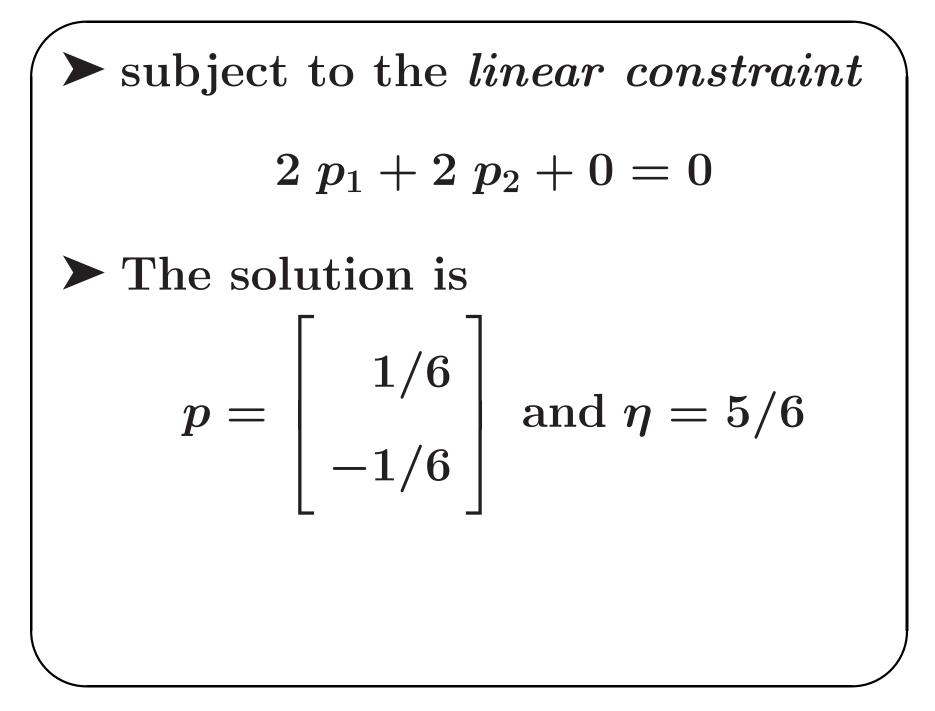


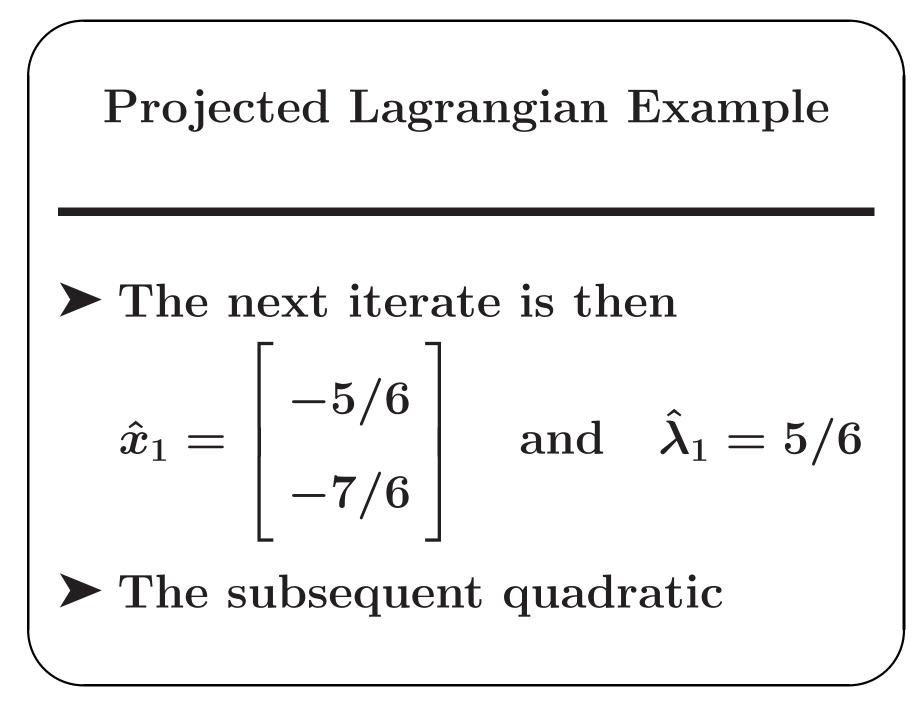
► This leads to

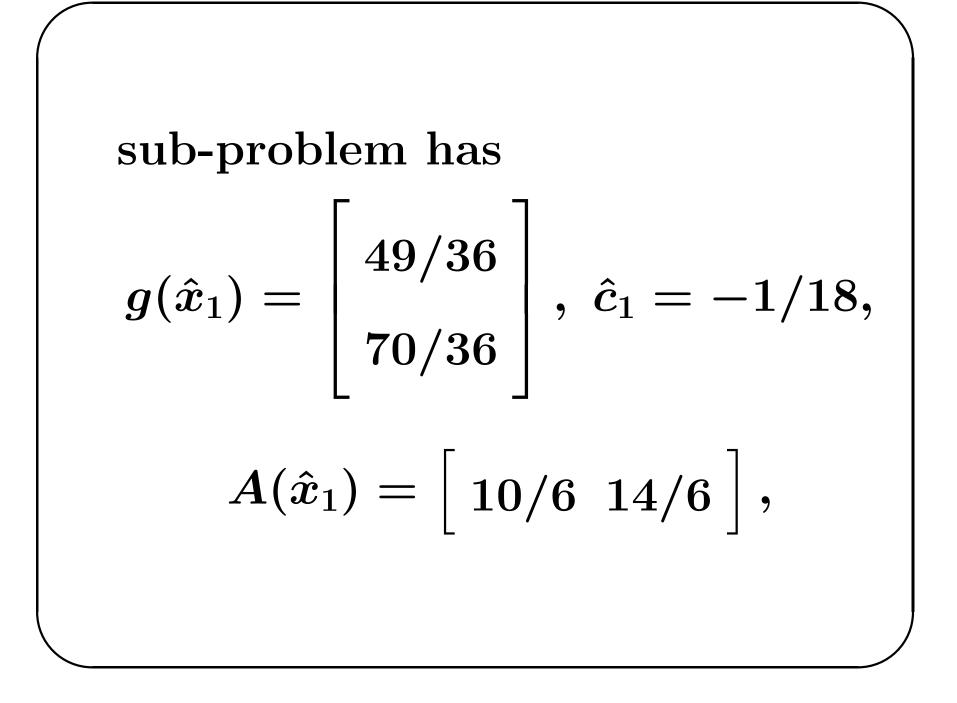
$$g(\hat{x}_0) = \begin{bmatrix} 1 \\ 2 \end{bmatrix}, \ A(\hat{x}_0) = \begin{bmatrix} 2 & 2 \end{bmatrix},$$

 $\hat{c}_0 = 0, \ \begin{bmatrix} \frac{\partial^2 \mathcal{L}}{\partial x^2} \end{bmatrix}_0 = \begin{bmatrix} 2 & -2 \\ -2 & 0 \end{bmatrix}$









 $\left[rac{\partial^2 \mathcal{L}}{\partial x^2}
ight]_1 = \left|egin{array}{ccc} 10/6 & -14/6\ -14/6\ \end{array}
ight|_0
ight|_1$ ► The solution is $p = \begin{vmatrix} 1/60 \\ 1/84 \end{vmatrix}$ and $\eta = 49/60$

