HW 7

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October 29, 2016

Laplacian smoothing

(A)

(B)

The problem is

$$\underset{x\in\mathbb{R}^n}{\text{minimize}}\ \frac{1}{2}\|y-x\|_2^2+\frac{\lambda}{2}x^\top Lx=\frac{1}{2}\left(x^\top x-2y^\top x+y^\top y+\lambda x^\top Lx\right)$$

which we can find a solution for by taking the gradient w.r.t. x.

$$\begin{aligned}0&=\frac{1}{2}\left(2x-2y+0+\lambda(L+L^\top)x\right)\\&=\left(I+\frac{1}{2}\lambda(L+L^\top)\right)x-y\\(I+\lambda L)\,\hat{x}&=y\end{aligned}$$

(C)

Graph fused lasso

References