Exercise: Shrinkage in linear regression

(Source: Jaakkola.) Consider performing linear regression with an orthonormal design matrix, so $||\mathbf{x}_{:,k}||_2^2 = 1$ for each column (feature) k, and $\mathbf{x}_{:,k}^T \mathbf{x}_{:,j} = 0$, so we can estimate each parameter w_k separately.

Figure 1 plots $\hat{w}_k$ vs $c_k = 2\mathbf{y}^T \mathbf{x}_{:,k}$, the correlation of feature k with the response, for 3 different esimation methods: ordinary least squares (OLS), ridge regression with parameter λ_2, and lasso with parameter λ_1.

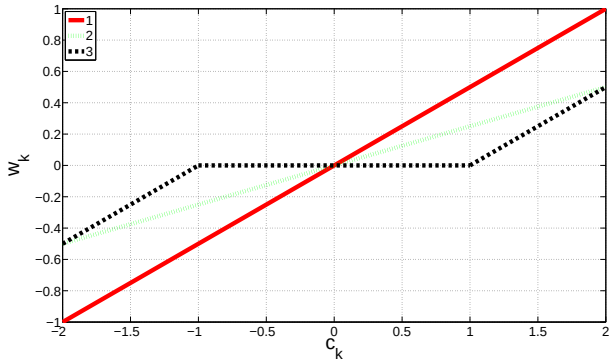

Figure 1: Plot of $\hat{w}_k$ vs amount of correlation c_k for three different estimators.

1. Unfortunately we forgot to label the plots. Which method does the solid (1), dotted (2) and dashed (3) line correspond to?
2. What is the value of λ_1?
3. What is the value of λ_2?