

00102892: Statistical Learning Homework 2  
Due: November 2, 2020

1. ESL Ex. 3.16
2. ESL Ex. 3.30
3. Derive the ADMM algorithm for the group Lasso problem

$$\min_{\boldsymbol{\beta}} \left\{ \frac{1}{2} \|\mathbf{y} - \mathbf{X}\boldsymbol{\beta}\|_2^2 + \lambda \sum_{g=1}^G \|\boldsymbol{\beta}_g\|_2 \right\},$$

where  $\boldsymbol{\beta} = (\boldsymbol{\beta}_1^T, \dots, \boldsymbol{\beta}_G^T)^T$ .

4. Let  $Z \sim N(0, \sigma^2)$ . Show that

$$\sup_{t>0} \left\{ P(Z \geq t) e^{t^2/(2\sigma^2)} \right\} = \frac{1}{2}.$$

5. ESL Ex. 4.2
6. ESL Ex. 4.3
7. ESL Ex. 4.5
8. ESL Ex. 4.6