

ST 705 Linear models and variance components

Lab practice problem set 1

January 10, 2023

1. Let $\{a_1, \dots, a_n\}$ and $\{b_1, \dots, b_n\}$ be sequences of real numbers. Show that

$$\min\{a_i\} + \min\{b_i\} \leq \min\{a_i + b_i\} \leq \min\{a_i\} + \max\{b_i\}.$$

2. Use Jensen's inequality to establish the arithmetic-geometric mean inequality. That is, show that if a_1, \dots, a_n are positive constants, then

$$\frac{1}{n} \sum_{i=1}^n a_i \geq \left(\prod_{i=1}^n a_i \right)^{\frac{1}{n}}.$$