University of Edinburgh, School of Mathematics
Statistical Research Skills
Assignment 3 - Simulation Report

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1. Introduction

This report consists of two main parts. In the first part, we aim to compute one-shot experiment on density function, `density()` also known as the kernel density estimator. In addition to that, we will compare with its other competitors such as orthogonal series estimator and penalised kernal density estimator.

2. Generating Data

3. Preliminary Experiment

Let $X_1, \ldots, X_n \overset{\text{iid}}{\sim} f$. The kernel estimator of f is defined as

$$\hat{f}(x) = \frac{1}{n} \sum_{i=1}^{n} K_h(x - X_i)$$

4. Monte Carlo Simulation Study

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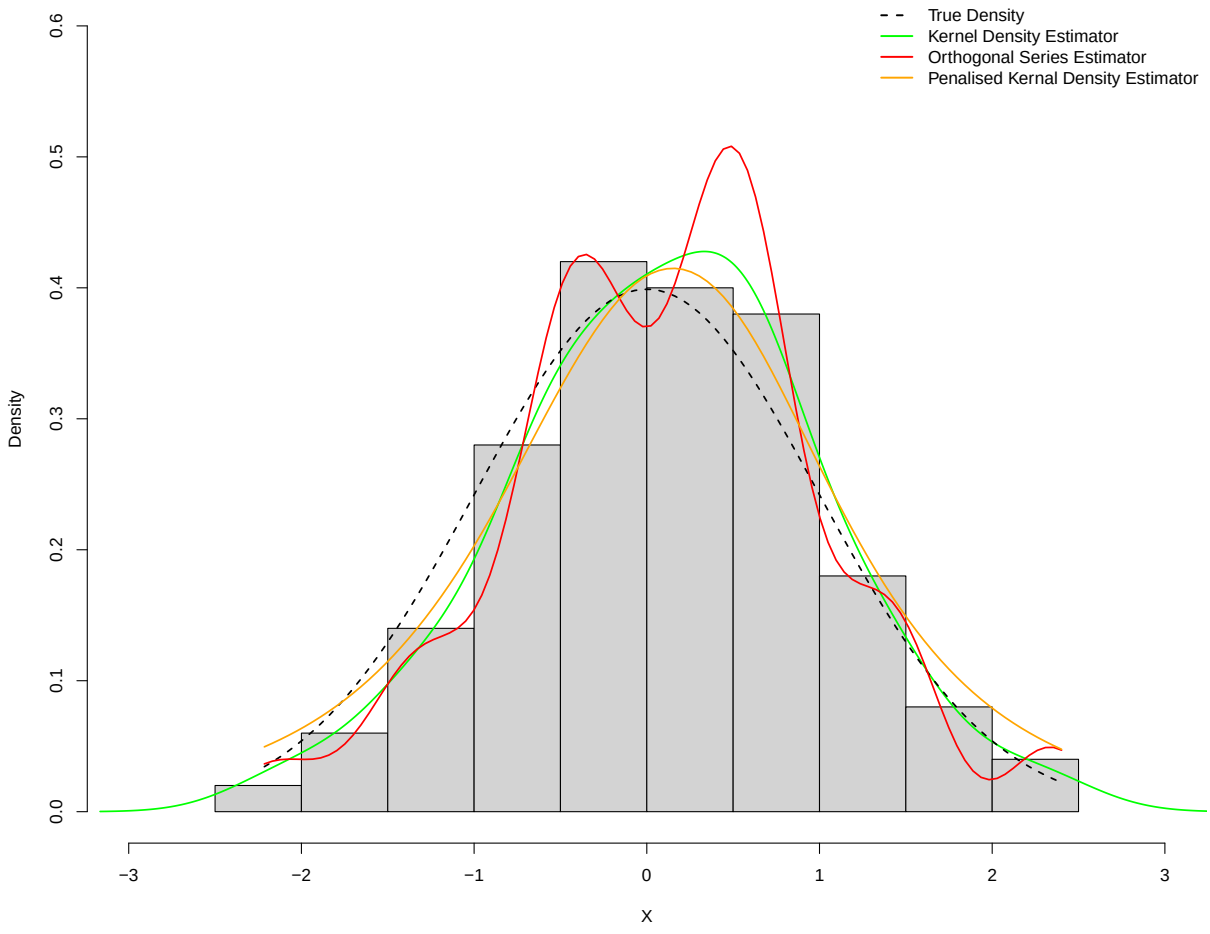

Figure 1: One-shot Experiment on Normal distribution

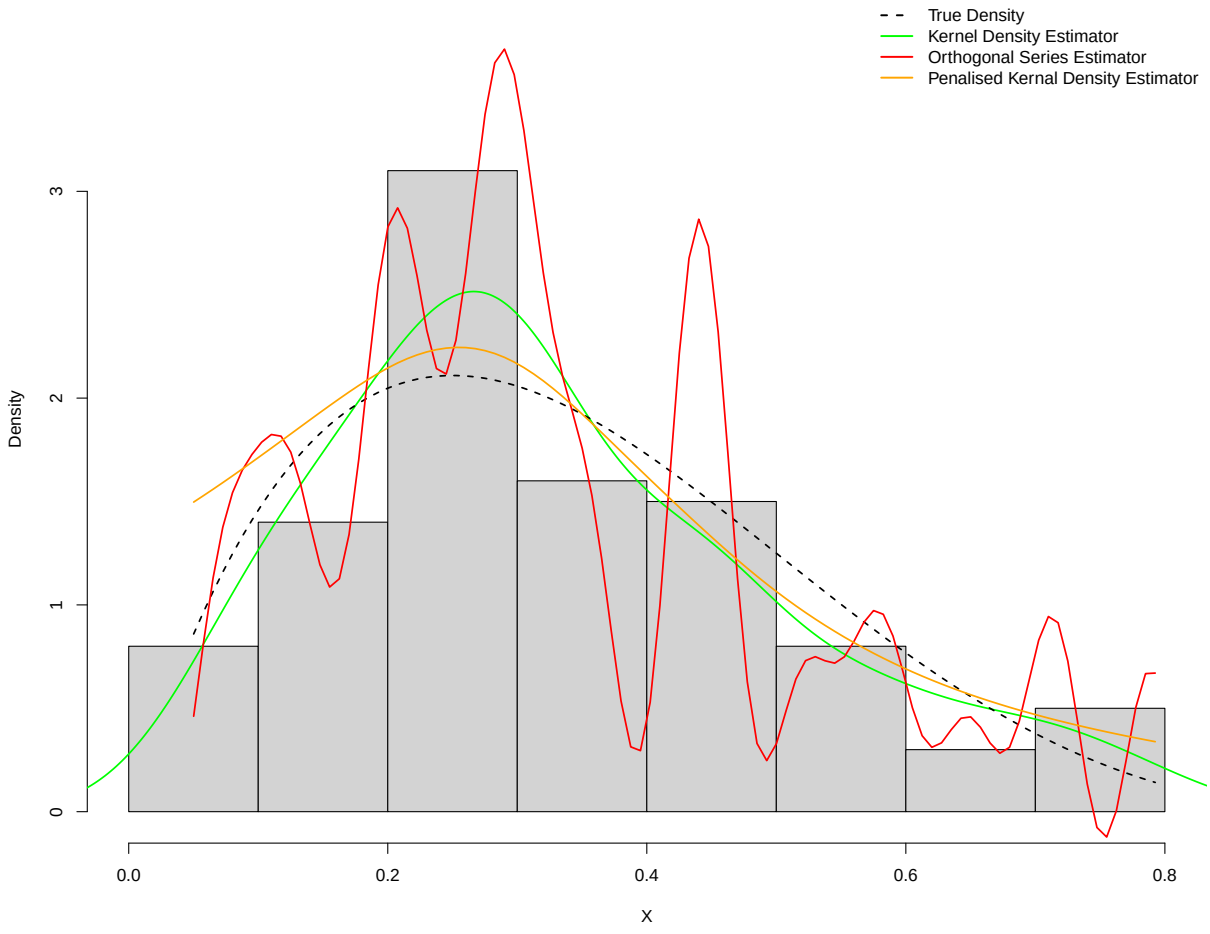

Figure 2: One-shot Experiment on Beta distribution

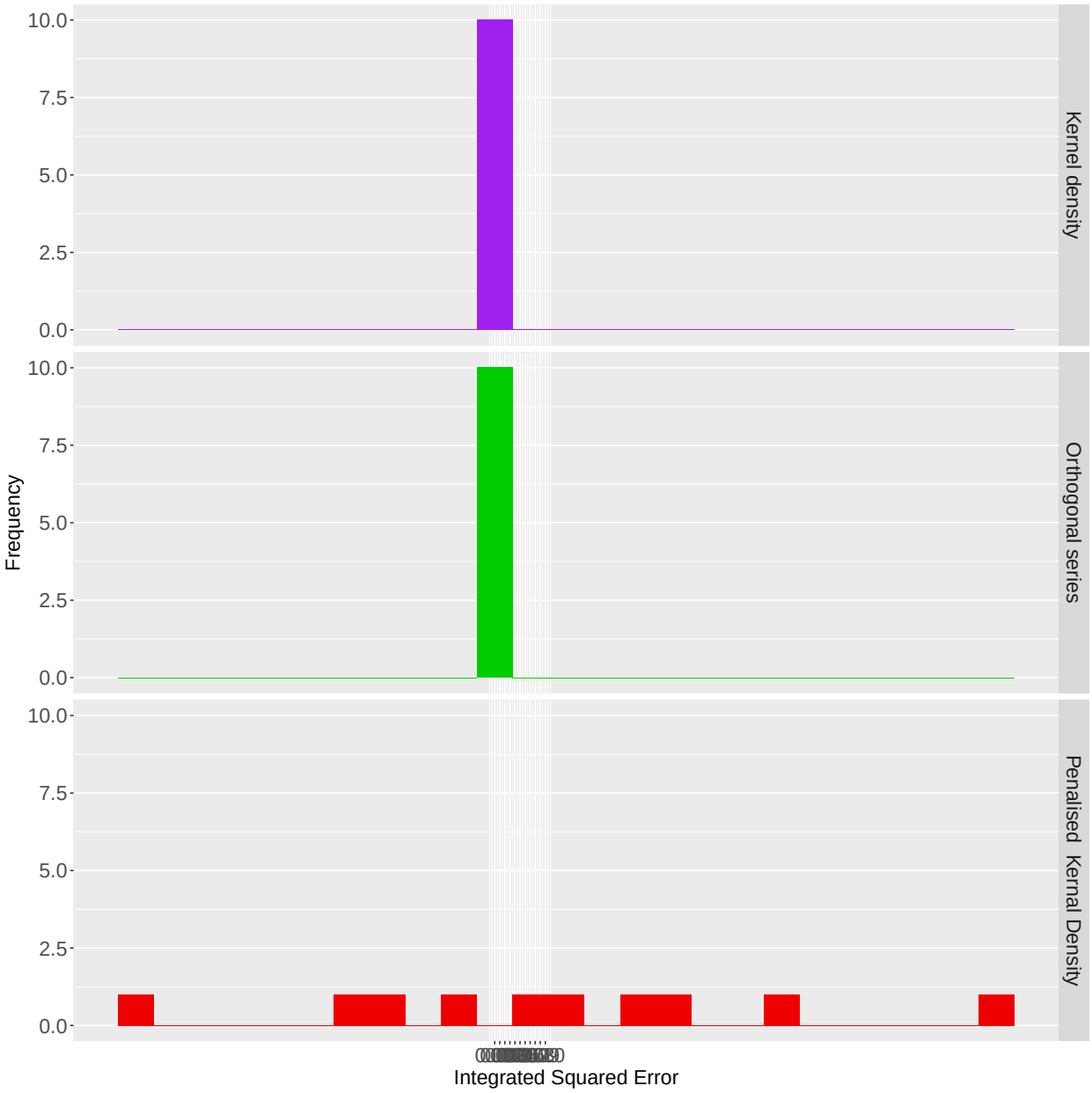

Figure 3: Integrated squared errors with size n = 250

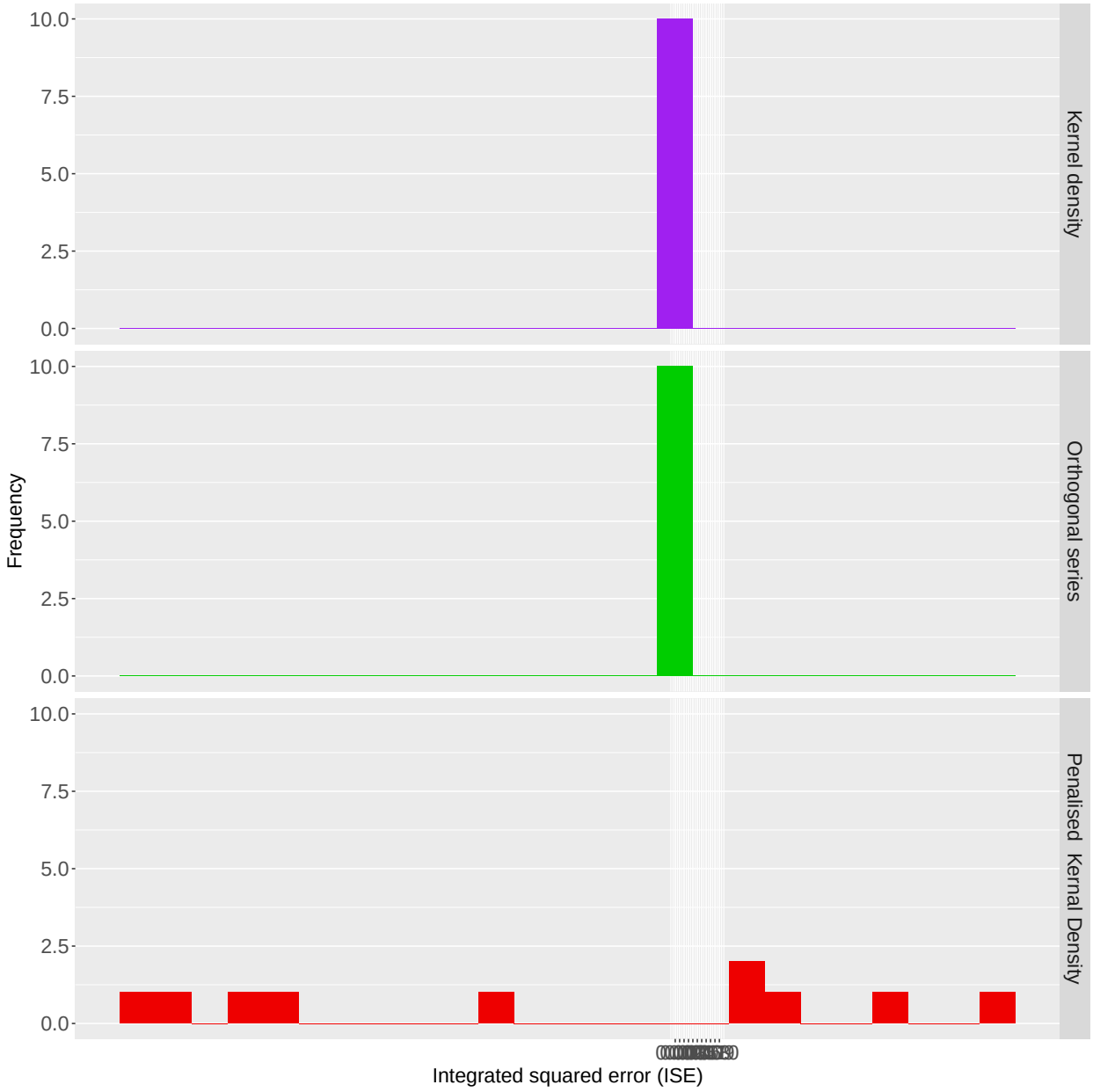

Figure 4: Integrated Squared Errors with size n = 500

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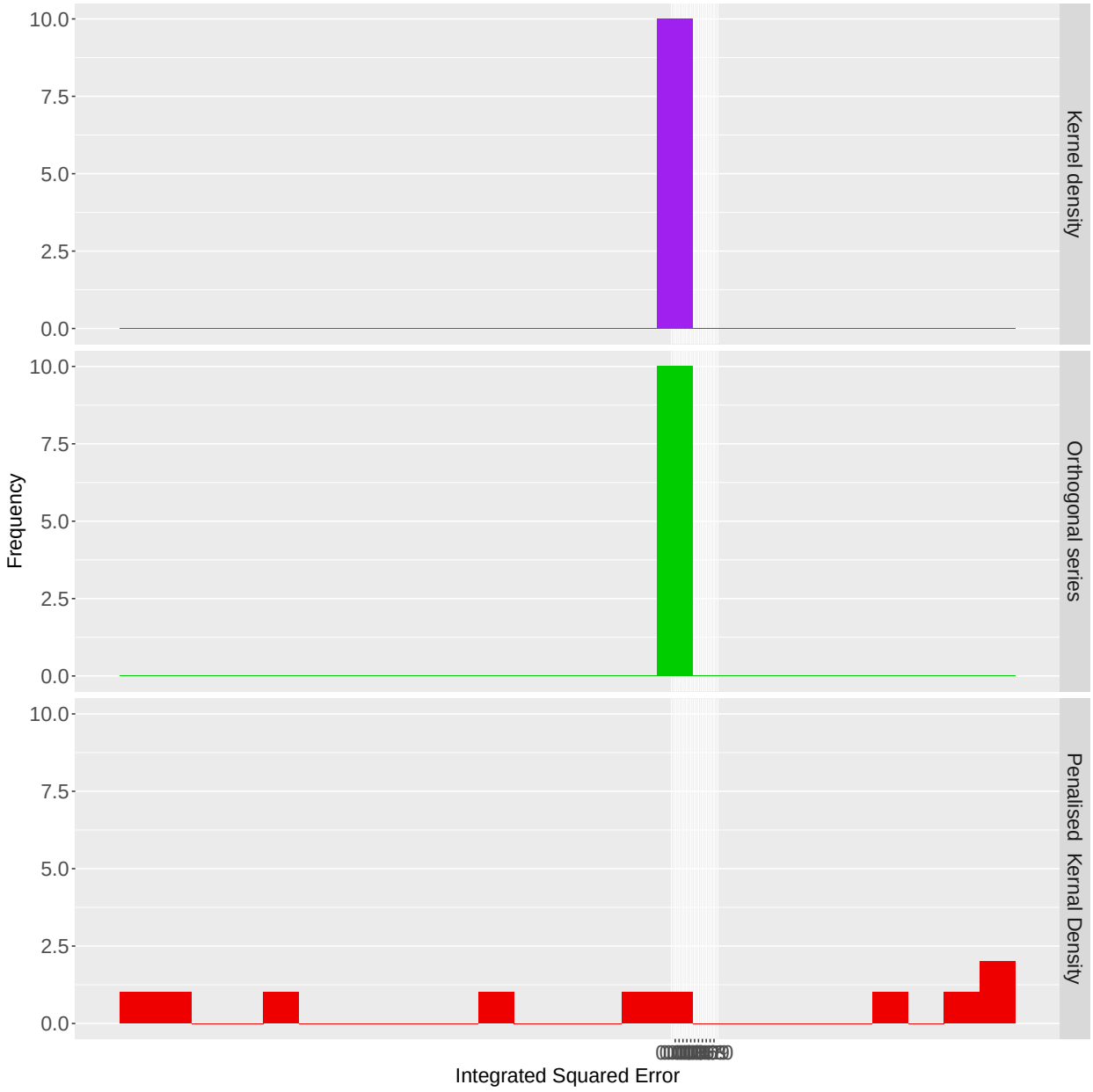

Figure 5: Integrated Squared Errors with size n = 1000

5. Conclusion