**REPORT**

5.1

The R-squared values from model fit statistics show exact equivalence between serial and parallel execution distributions because they share identical mean (0.7535507), IQR (0.03789073), Q1 (0.7339122) and Q3 (0.7718029). The exact match between both approaches demonstrates correct implementation because we used the same seed and bootstrap indices to ensure the methods analyzed identical bootstrapped samples. The parallel implementation demonstrated identical distribution results to the serial computations thus proving it correctly replicated the serial processes without any computational deviations or mistakes.

5.2

The execution times between serial and parallel execution methods showed an unexpected result where the serial execution completed in 0.33 seconds while parallel execution took 2.61 seconds. The execution time of parallel processes (2.61 seconds) exceeded serial execution time (0.33 seconds) because the parallel setup costs (cluster creation and node data transfer) exceeded the potential speedup benefits from parallel processing. The administrative burden of parallel processing exceeded its advantages in this situation because it revealed parallelization is not beneficial for small computational workloads and results in performance degradation due to setup and coordination expenses.