sample_mean_sim_vary.R

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```
# This is the main simulator file

# Delete any plots that were previously created
if(!is.null(dev.list())){
     dev.off()
}
```

```
## null device
##           1
```

```
# Clear any previously stored variables, functions, etc.
rm(list=ls())

library(simulator) # this file was created under simulator version 0.2.5
library(ggplot2)

source("model_functions.R")
source("method_functions.R")
source("eval_functions.R")

# Set seed for reproducibility
set.seed(812)
```

```
name_of_simulation <- "mean_sim_vary_vary"
```

```
mean_sim_vary <- new_simulation(name="name_of_simulation",
     label="Sample Mean (varying n)")

mean_sim_vary <- generate_model(mean_sim_vary, make_model=sample_mean_model,
     n=list(50, 500), mu=0, vary_along="n")
```

```
## ..Created model and saved in samp_mean_mod/mu_0/n_50/model.Rdata
## ..Created model and saved in samp_mean_mod/mu_0/n_500/model.Rdata
```

```
mean_sim_vary <- simulate_from_model(mean_sim_vary, nsim=20)
```

```
## ..Simulated 20 draws in 0 sec and saved in samp_mean_mod/mu_0/n_50/r1.Rdata
## ..Simulated 20 draws in 0 sec and saved in samp_mean_mod/mu_0/n_500/r1.Rdata
```

```
mean_sim_vary <- run_method(mean_sim_vary, methods=list(sample_mean_meth,
     sample_median_meth))
```

```
## ..Performed Sample Mean in 0 seconds (on average over 20 sims)
## ..Performed Sample Median in 0 seconds (on average over 20 sims)
## ..Performed Sample Mean in 0 seconds (on average over 20 sims)
## ..Performed Sample Median in 0 seconds (on average over 20 sims)
```

```
mean_sim_vary <- evaluate(mean_sim_vary, metrics=list(se_metric))
```

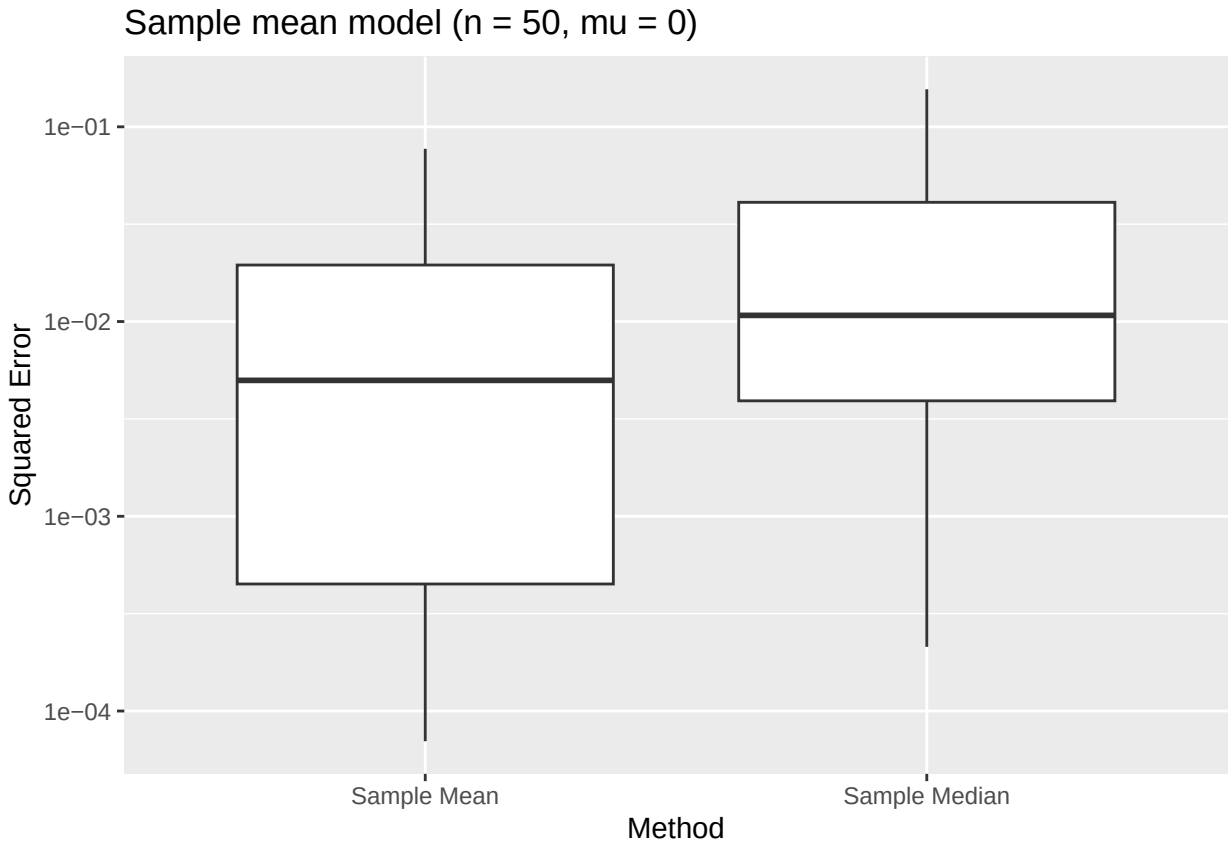
```
## ..Evaluated Sample Mean in terms of Squared Error, Computing time (sec)
## ..Evaluated Sample Median in terms of Squared Error, Computing time (sec)
## ..Evaluated Sample Mean in terms of Squared Error, Computing time (sec)
## ..Evaluated Sample Median in terms of Squared Error, Computing time (sec)
```

```
save_simulation(mean_sim_vary)
```

```
plot1 <- plot_eval(subset_simulation(mean_sim_vary, n == 50),
     metric_name="se_metric") + scale_y_log10()
```

```
## Scale for y is already present.
## Adding another scale for y, which will replace the existing scale.
```

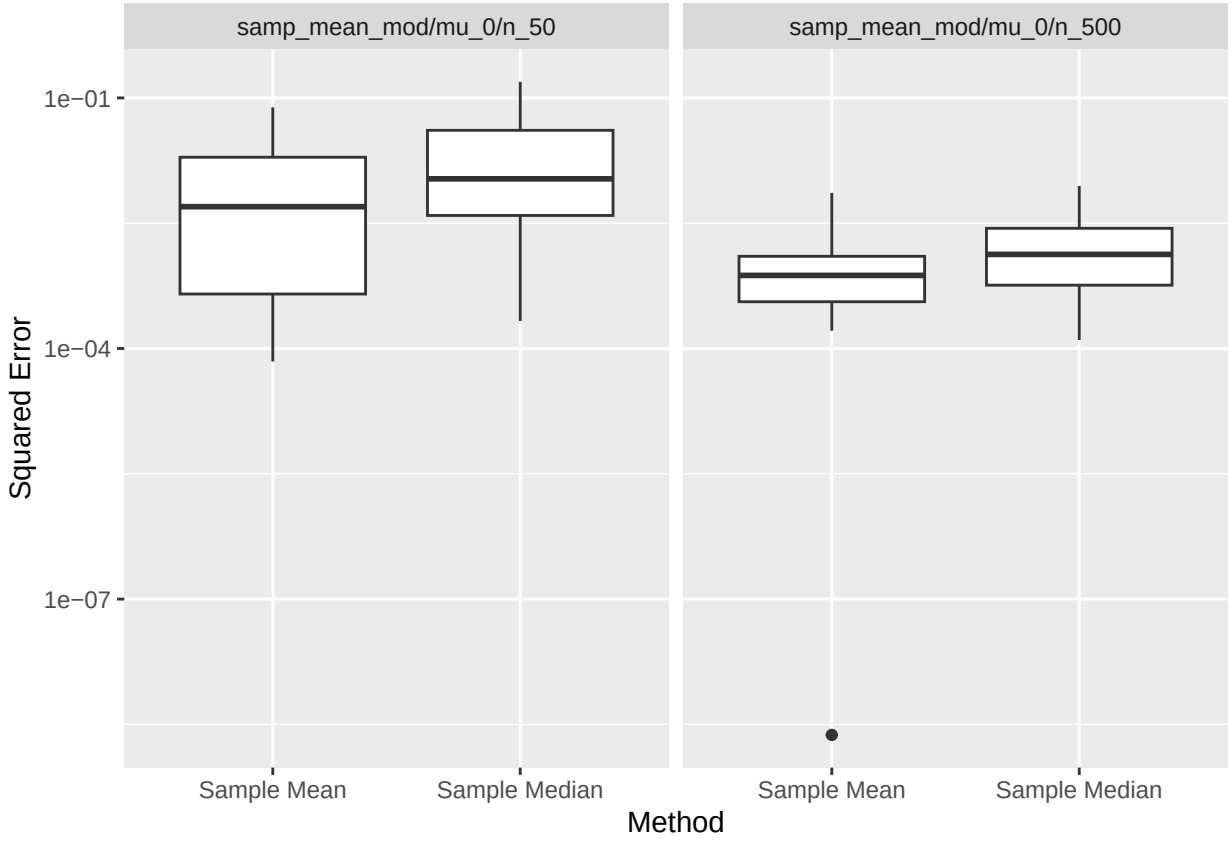
```
print(plot1)
```




```
plot2 <- plot_eval(mean_sim_vary, metric_name="se_metric") + scale_y_log10()
```

```
## Scale for y is already present.
## Adding another scale for y, which will replace the existing scale.
```

```
print(plot2)
```



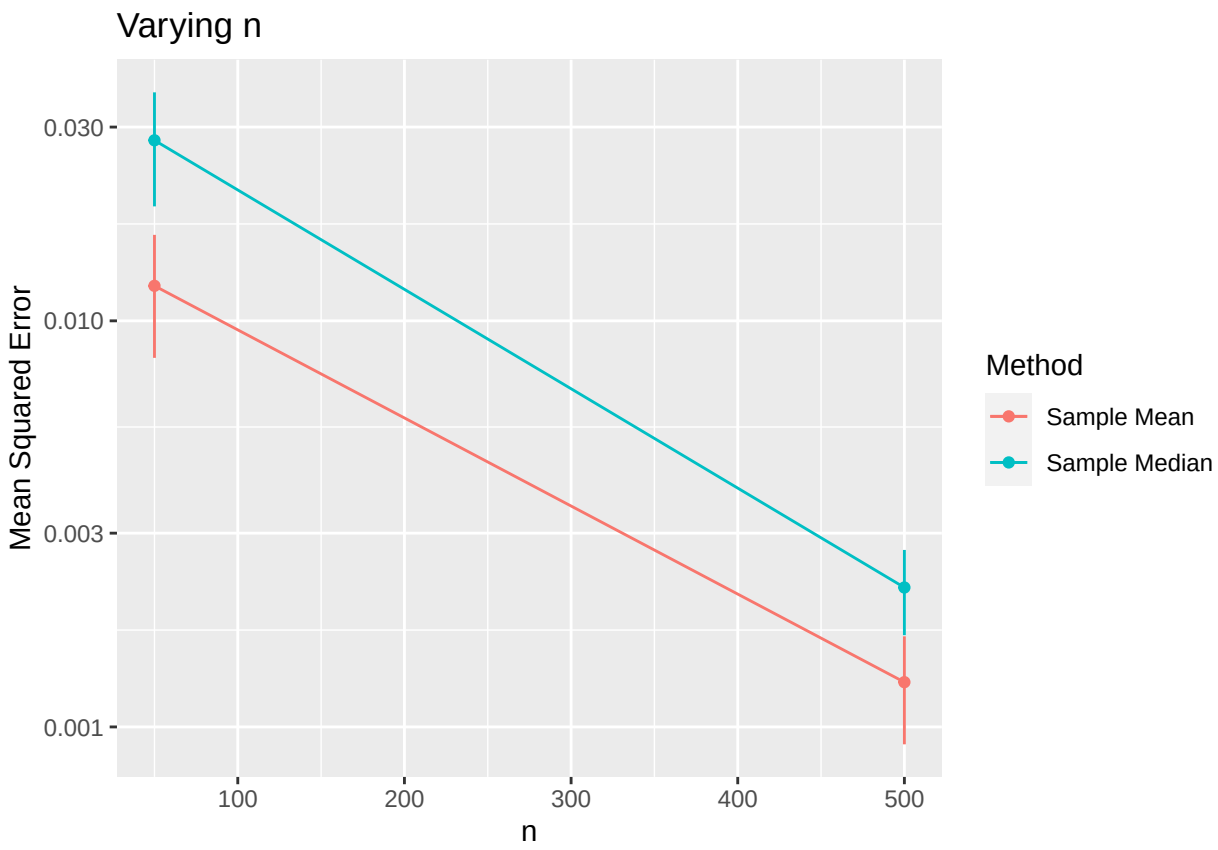

```
plot3 <- plot_eval_by(mean_sim_vary, metric_name="se_metric", varying="n") +
     scale_y_log10()
```

```
## Scale for y is already present.
## Adding another scale for y, which will replace the existing scale.
```

```
print(plot3)
```

Table 1: A comparison of Mean Squared Error (averaged over 20 replicates).

	Sample Mean	Sample Median
Sample mean model (n = 50, mu = 0)	0.012194415 (0.0040880589)	0.027831993 (0.0086976485)
Sample mean model (n = 500, mu = 0)	0.001288997 (0.0003829079)	0.002204855 (0.0005232607)




```
# Create a table
tabulate_eval(mean_sim_vary, metric_name="se_metric")
```

```
## % generated by simulator on Fri Jun 30 17:35:08 2023.
```

```
# Create a dataframe of metrics for further processing (calculating mean and
# standard deviation, statistical inference, etc.)
results_df <- as.data.frame(evals(mean_sim_vary))

print("Results data.frame:")
```

```
## [1] "Results data.frame:"
```

```
print(results_df)
```

```
##                       Model             Method  Draw    se_metric  time
## 1   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.1 2.280214e-02 0.000
## 2   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.2 7.710411e-02 0.002
## 3   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.3 2.718175e-04 0.000
## 4   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.4 1.471110e-02 0.000
## 5   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.5 3.043416e-02 0.000
## 6   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.6 8.305322e-03 0.000
```

```
## 7   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.7 6.468685e-03 0.000
## 8   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.8 4.654931e-03 0.000
## 9   samp_mean_mod/mu_0/n_50   sample_mean_meth  r1.9 2.208715e-02 0.000
## 10  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.10 2.659279e-02 0.000
## 11  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.11 2.222777e-03 0.000
## 12  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.12 8.315450e-05 0.000
## 13  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.13 5.345945e-03 0.000
## 14  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.14 5.308264e-04 0.000
## 15  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.15 9.112280e-05 0.000
## 16  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.16 1.616942e-04 0.000
## 17  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.17 1.961176e-03 0.000
## 18  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.18 6.994518e-05 0.000
## 19  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.19 1.871306e-02 0.000
## 20  samp_mean_mod/mu_0/n_50   sample_mean_meth r1.20 1.276389e-03 0.000
## 21  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.1 4.803559e-02 0.000
## 22  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.2 8.912851e-02 0.002
## 23  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.3 5.542021e-03 0.000
## 24  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.4 9.791355e-04 0.000
## 25  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.5 1.558958e-01 0.000
## 26  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.6 6.398637e-02 0.000
## 27  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.7 3.321099e-03 0.000
## 28  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.8 1.262315e-02 0.000
## 29  samp_mean_mod/mu_0/n_50 sample_median_meth  r1.9 5.448745e-03 0.000
## 30  samp_mean_mod/mu_0/n_50 sample_median_meth r1.10 1.486842e-02 0.000
## 31  samp_mean_mod/mu_0/n_50 sample_median_meth r1.11 2.135181e-04 0.000
## 32  samp_mean_mod/mu_0/n_50 sample_median_meth r1.12 4.136928e-03 0.000
## 33  samp_mean_mod/mu_0/n_50 sample_median_meth r1.13 1.771427e-02 0.000
## 34  samp_mean_mod/mu_0/n_50 sample_median_meth r1.14 9.163770e-03 0.001
## 35  samp_mean_mod/mu_0/n_50 sample_median_meth r1.15 3.207038e-02 0.000
## 36  samp_mean_mod/mu_0/n_50 sample_median_meth r1.16 7.186121e-04 0.000
## 37  samp_mean_mod/mu_0/n_50 sample_median_meth r1.17 4.579032e-02 0.000
## 38  samp_mean_mod/mu_0/n_50 sample_median_meth r1.18 6.121690e-03 0.000
## 39  samp_mean_mod/mu_0/n_50 sample_median_meth r1.19 3.945839e-02 0.000
## 40  samp_mean_mod/mu_0/n_50 sample_median_meth r1.20 1.423130e-03 0.000
## 41 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.1 7.291924e-03 0.000
## 42 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.2 9.616474e-04 0.000
## 43 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.3 1.463798e-03 0.000
## 44 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.4 4.974969e-04 0.000
## 45 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.5 4.054303e-04 0.000
## 46 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.6 2.364368e-09 0.000
## 47 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.7 3.980584e-03 0.000
## 48 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.8 4.162981e-04 0.000
## 49 samp_mean_mod/mu_0/n_500   sample_mean_meth  r1.9 1.210825e-03 0.000
## 50 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.10 2.607340e-04 0.000
## 51 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.11 1.849622e-04 0.000
## 52 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.12 8.129744e-04 0.000
## 53 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.13 2.819864e-03 0.000
## 54 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.14 2.281764e-04 0.000
## 55 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.15 1.630543e-04 0.000
## 56 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.16 9.610049e-04 0.000
## 57 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.17 1.024174e-03 0.000
## 58 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.18 1.782413e-03 0.000
## 59 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.19 6.227808e-04 0.000
## 60 samp_mean_mod/mu_0/n_500   sample_mean_meth r1.20 6.917854e-04 0.000
```

```
## 61 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.1 1.394907e-03 0.000
## 62 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.2 4.740467e-04 0.001
## 63 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.3 1.334683e-03 0.000
## 64 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.4 2.301309e-03 0.000
## 65 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.5 1.344277e-03 0.000
## 66 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.6 2.015818e-03 0.000
## 67 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.7 6.401390e-03 0.000
## 68 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.8 1.265653e-04 0.000
## 69 samp_mean_mod/mu_0/n_500 sample_median_meth  r1.9 2.609875e-04 0.000
## 70 samp_mean_mod/mu_0/n_500 sample_median_meth r1.10 6.019885e-04 0.000
## 71 samp_mean_mod/mu_0/n_500 sample_median_meth r1.11 8.822863e-03 0.000
## 72 samp_mean_mod/mu_0/n_500 sample_median_meth r1.12 1.260911e-03 0.000
## 73 samp_mean_mod/mu_0/n_500 sample_median_meth r1.13 7.586694e-04 0.000
## 74 samp_mean_mod/mu_0/n_500 sample_median_meth r1.14 4.680877e-03 0.000
## 75 samp_mean_mod/mu_0/n_500 sample_median_meth r1.15 2.212207e-04 0.000
## 76 samp_mean_mod/mu_0/n_500 sample_median_meth r1.16 4.973344e-03 0.000
## 77 samp_mean_mod/mu_0/n_500 sample_median_meth r1.17 4.941464e-04 0.000
## 78 samp_mean_mod/mu_0/n_500 sample_median_meth r1.18 3.214555e-03 0.000
## 79 samp_mean_mod/mu_0/n_500 sample_median_meth r1.19 8.071576e-04 0.000
## 80 samp_mean_mod/mu_0/n_500 sample_median_meth r1.20 2.607383e-03 0.001
```