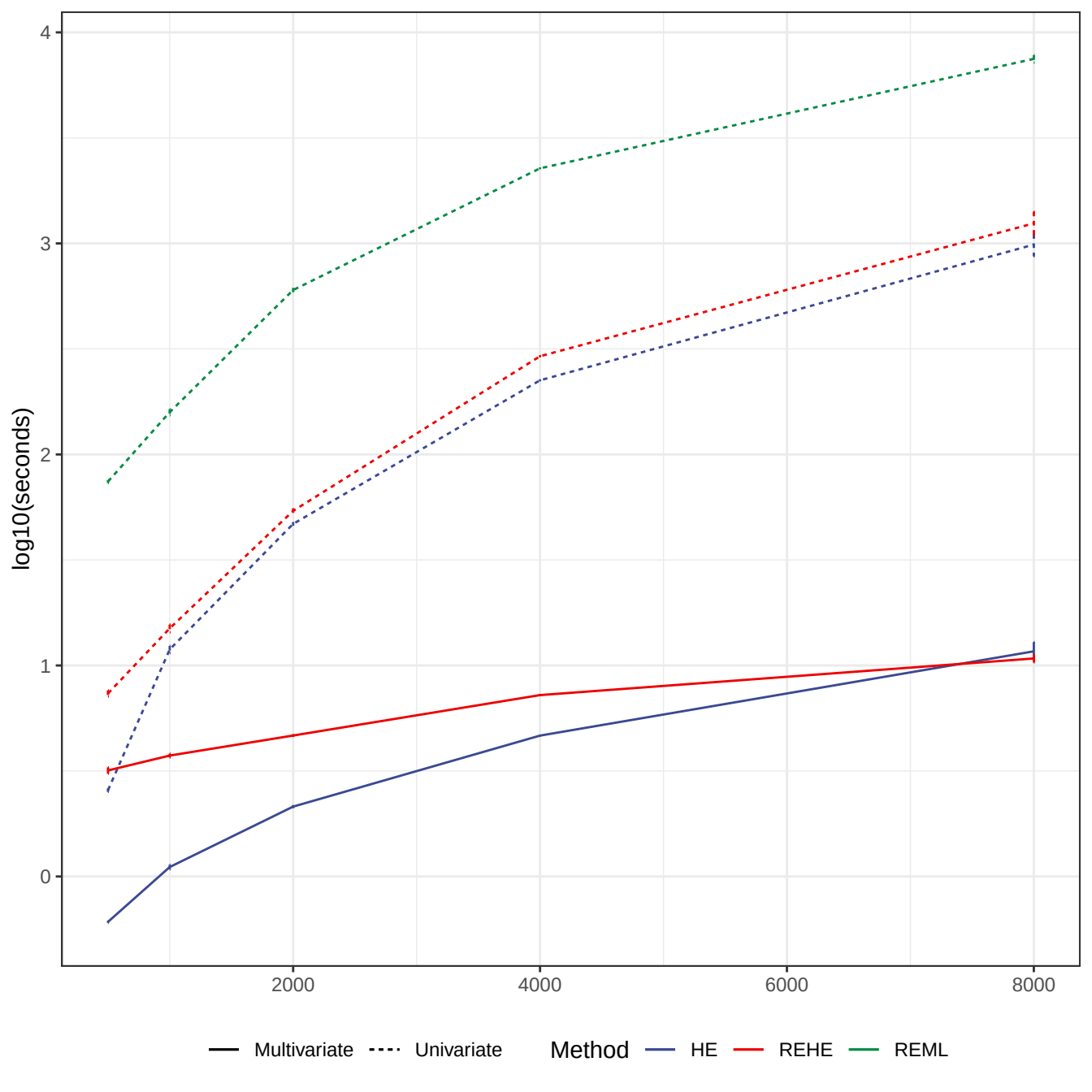
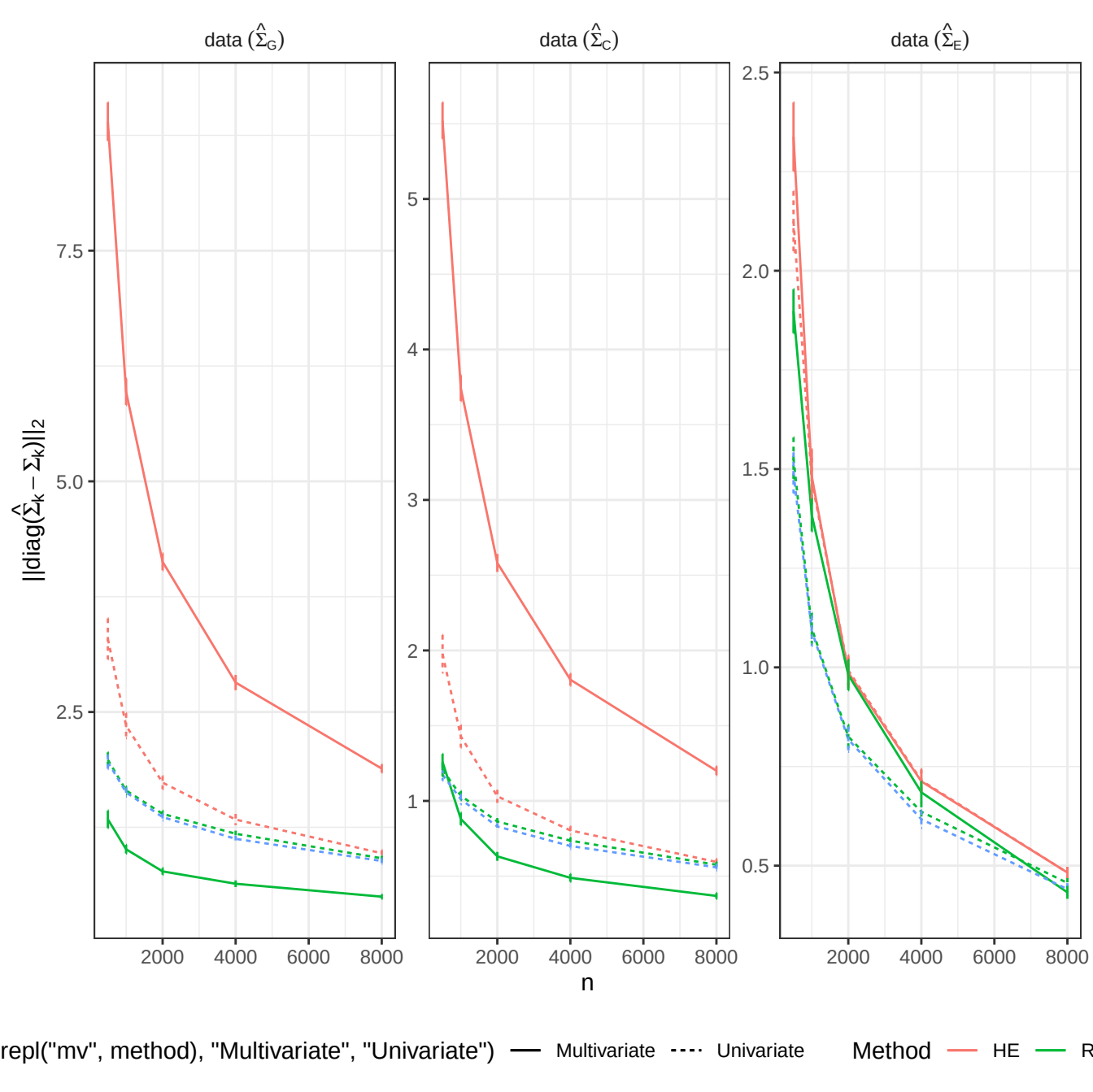
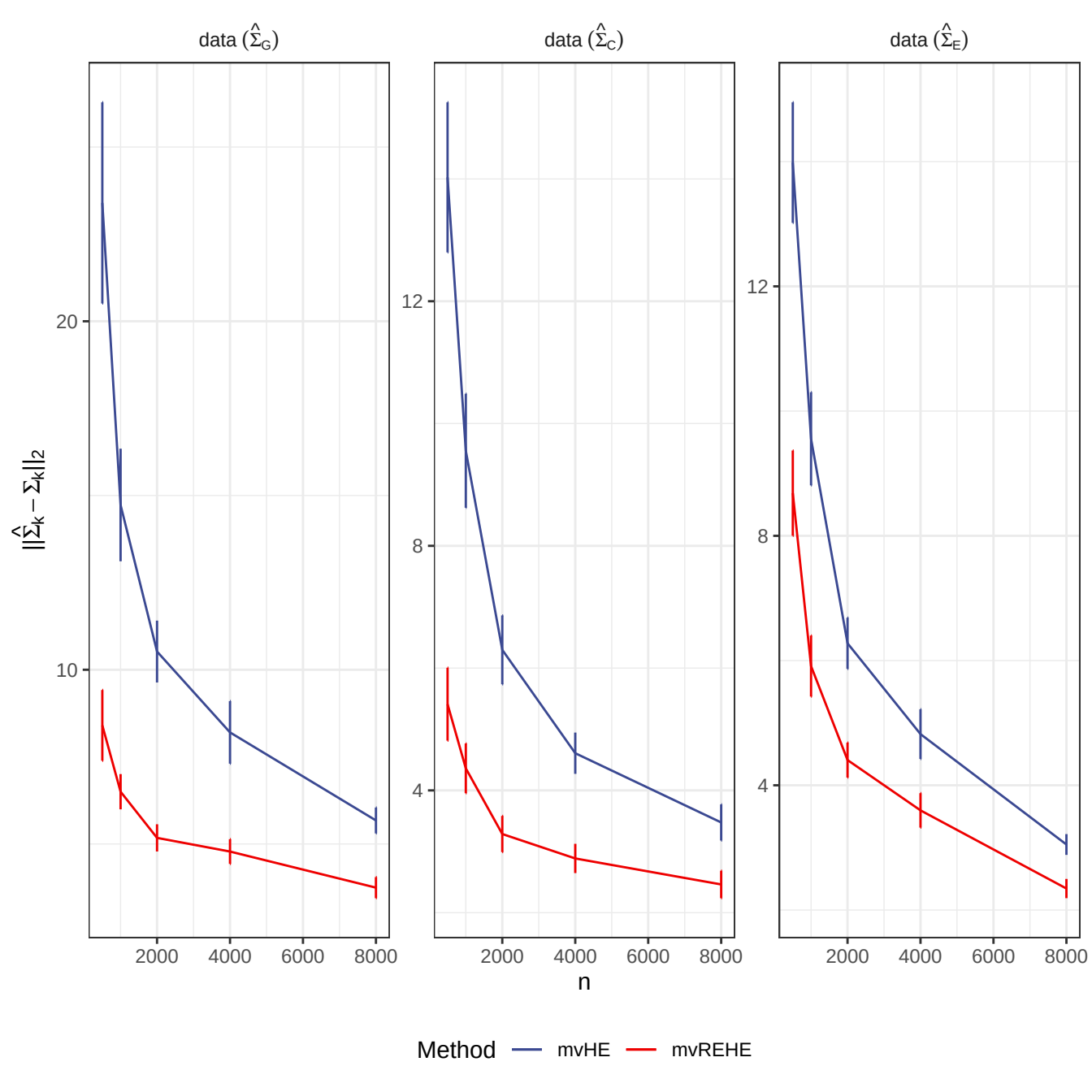
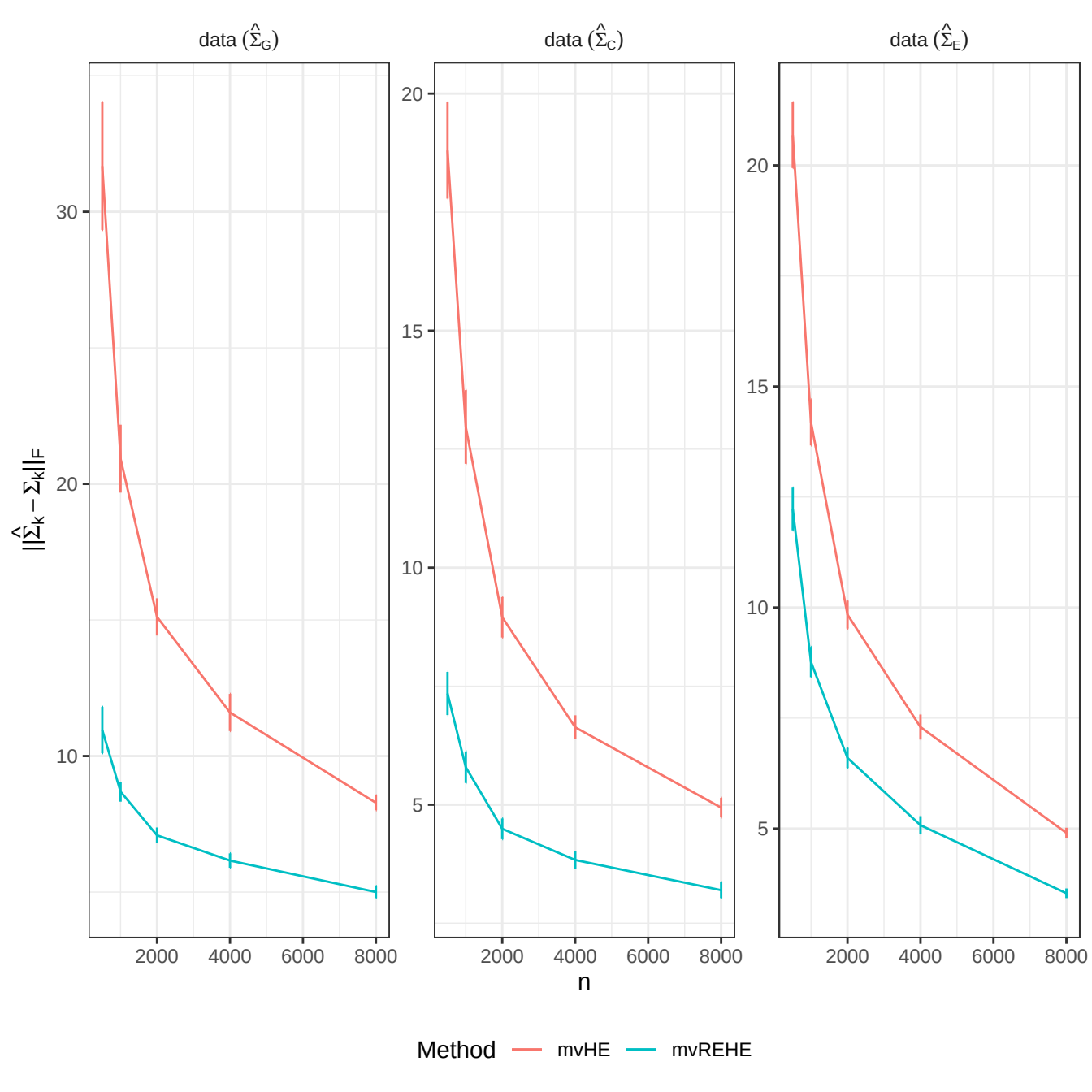
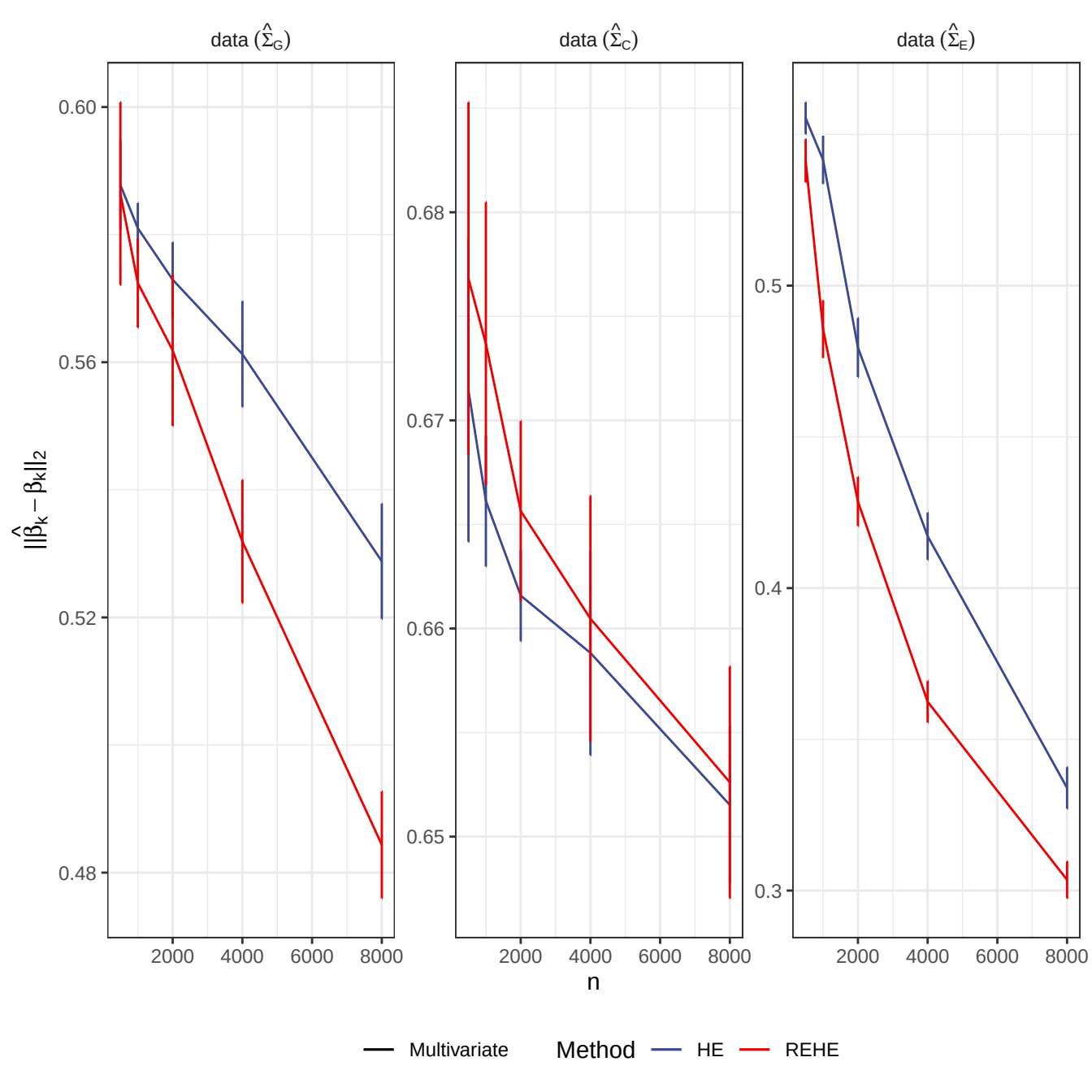
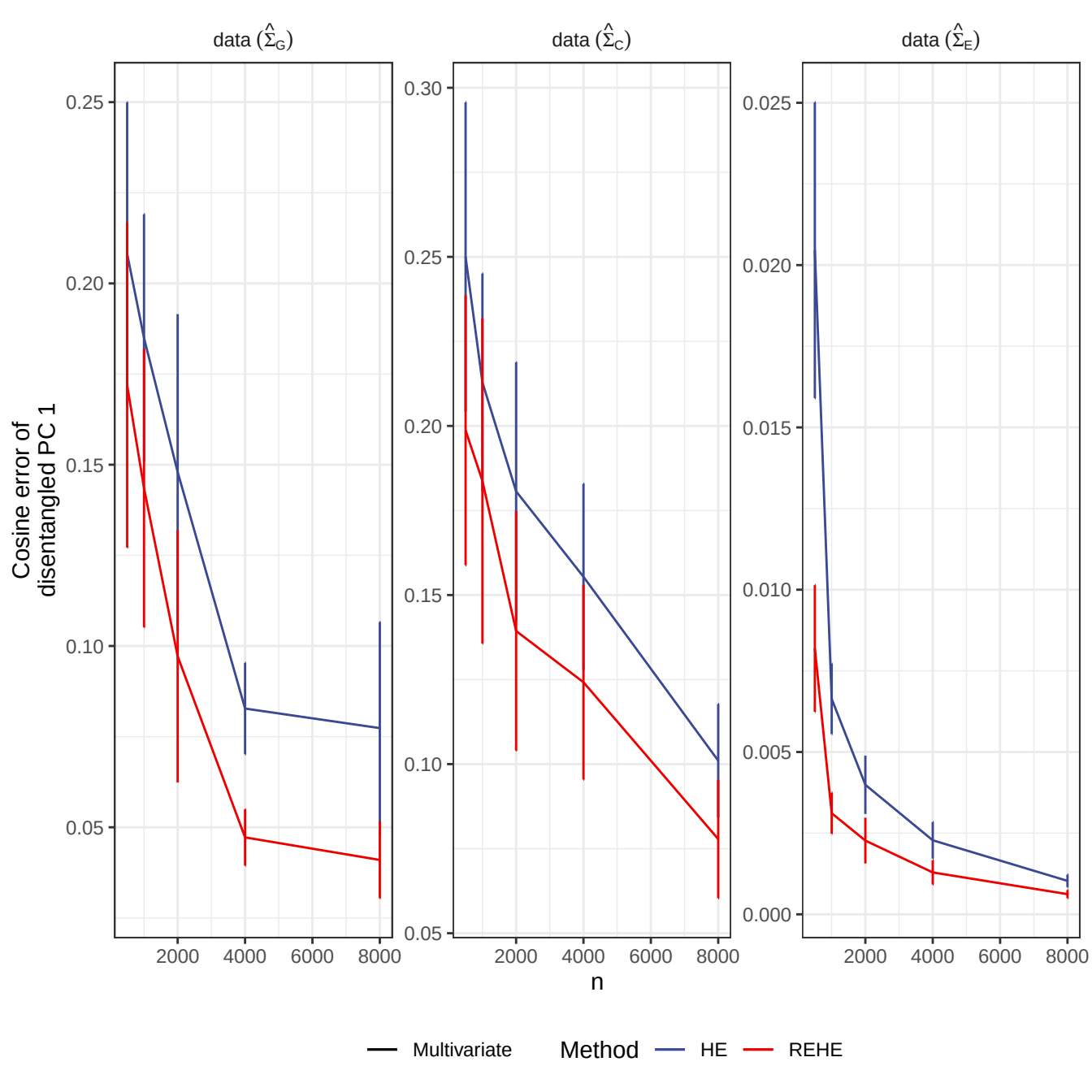

log10(seconds)
4
3
2
1
0
2000
4000
6000
8000
Multivariate
Univariate
Method
HE
REHE
REML

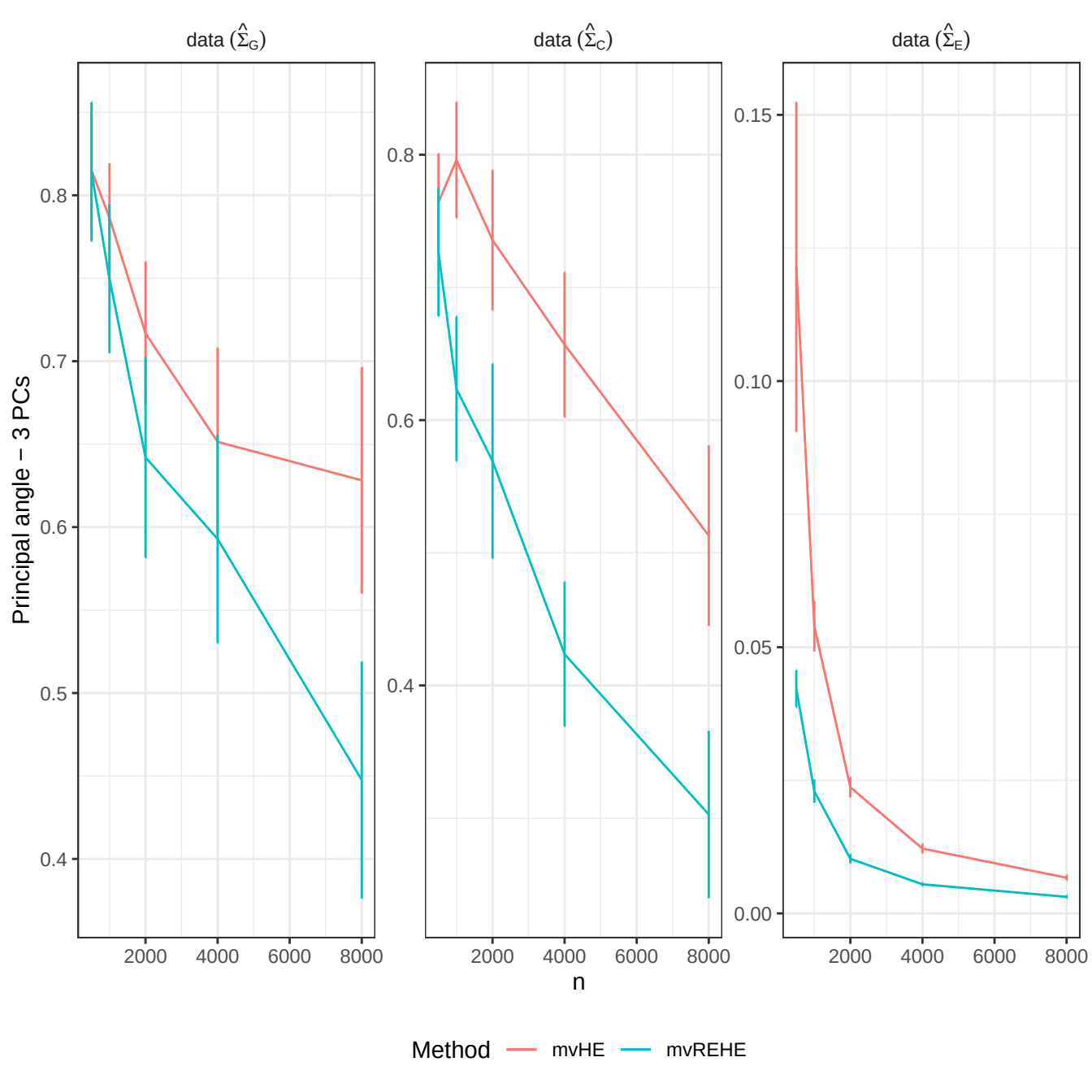

data ($\hat{\Sigma}_G$)
data ($\hat{\Sigma}_C$)
data ($\hat{\Sigma}_E$)
$||\text{diag}(\hat{\Sigma}_k - \Sigma_k)||_2$
n
repl("mv", method), "Multivariate", "Univariate")
Multivariate
Univariate
Method
HE

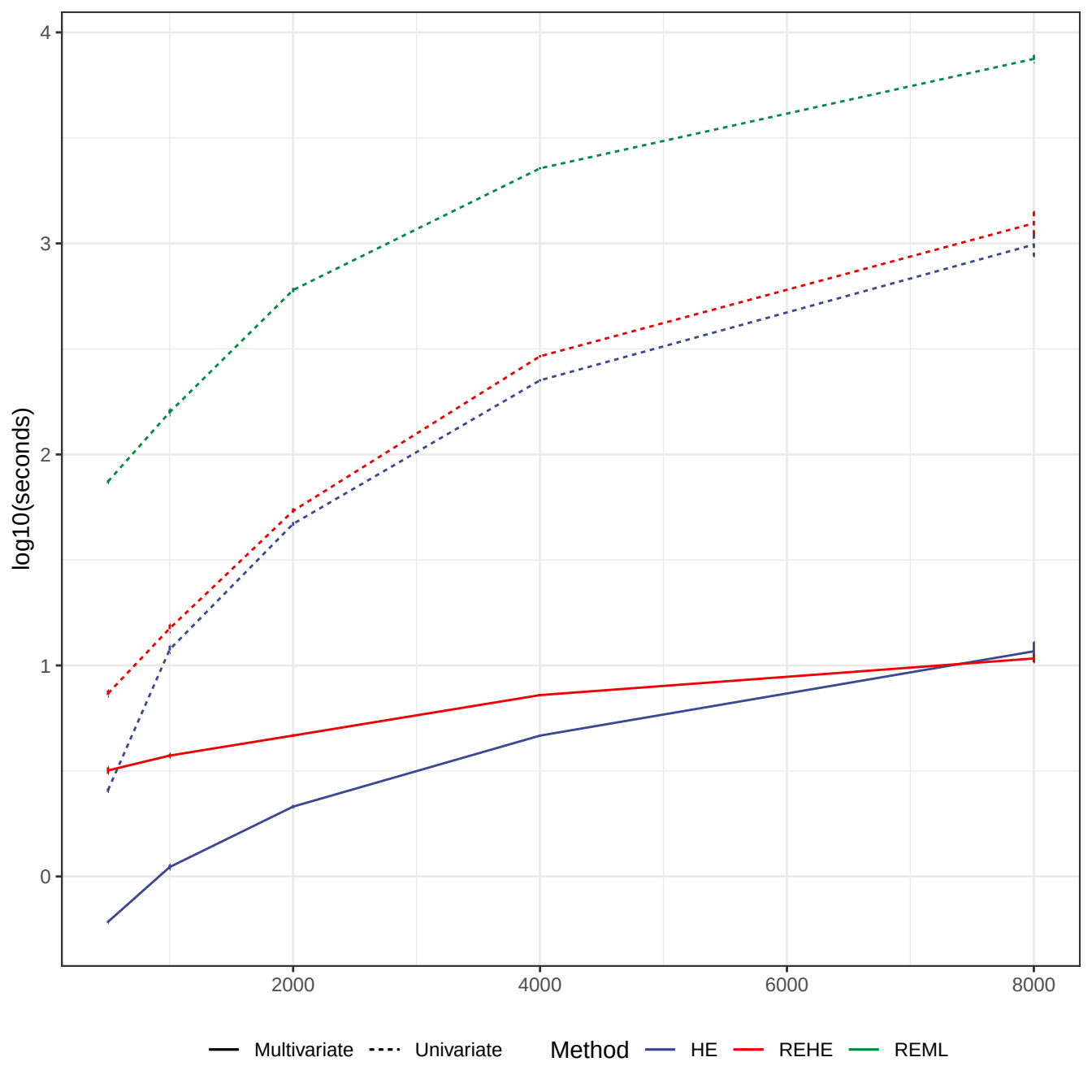

data ($\hat{\Sigma}_G$)
data ($\hat{\Sigma}_C$)
data ($\hat{\Sigma}_E$)
$||\hat{\Sigma}_k - \Sigma_k||_2$
20
10
12
8
4
12
8
4
2000
4000
6000
8000
n
Method
mvHE
mvREHE

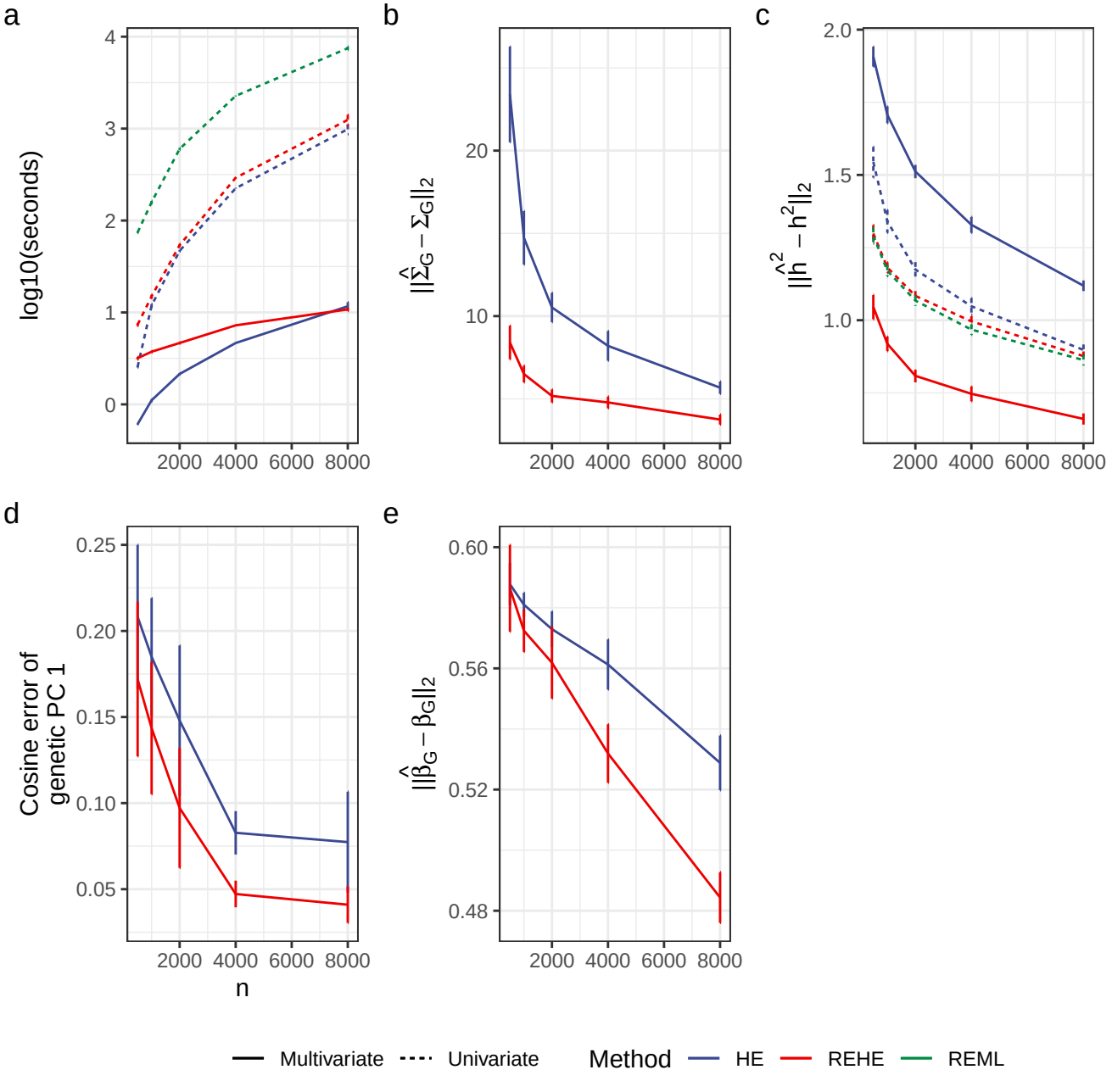

data ($\hat{\Sigma}_G$)
data ($\hat{\Sigma}_C$)
data ($\hat{\Sigma}_E$)
$||\hat{\Sigma}_k - \Sigma_k||_F$
n
Method
mvHE
mvREHE


data ($\hat{\Sigma}_G$)
data ($\hat{\Sigma}_C$)
data ($\hat{\Sigma}_E$)
$||\hat{\beta}_k - \beta_k||_2$
0.60
0.56
0.52
0.48
0.68
0.67
0.66
0.65
0.5
0.4
0.3
2000
4000
6000
8000
n
Multivariate
Method
HE
REHE


data ($\hat{\Sigma}_G$)
data ($\hat{\Sigma}_C$)
data ($\hat{\Sigma}_E$)
Cosine error of disentangled PC 1
n
Method
HE
REHE
Multivariate


data ($\hat{\Sigma}_G$)
data ($\hat{\Sigma}_C$)
data ($\hat{\Sigma}_E$)
Principal angle – 3 PCs
n
0.8
0.7
0.6
0.5
0.4
0.15
0.10
0.05
0.00
2000
4000
6000
8000
Method
mvHE
mvREHE


log10(seconds)
4
3
2
1
0
2000
4000
6000
8000
Multivariate
Univariate
Method
HE
REHE
REML


a
b
c
d
e
log10(seconds)
$||\hat{\Sigma}_G - \Sigma_G||_2$
$||\hat{h}^2 - h^2||_2$
Cosine error of genetic PC 1
$||\hat{\beta}_G - \beta_G||_2$
n
2000 4000 6000 8000
Multivariate
Univariate
Method
HE
REHE
REML