Experiments

Exp 1. How good is the last iteration of the MCEM

```r
time = proc.time()
n_sim = 1000
n_trees = 10
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.1,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)
```
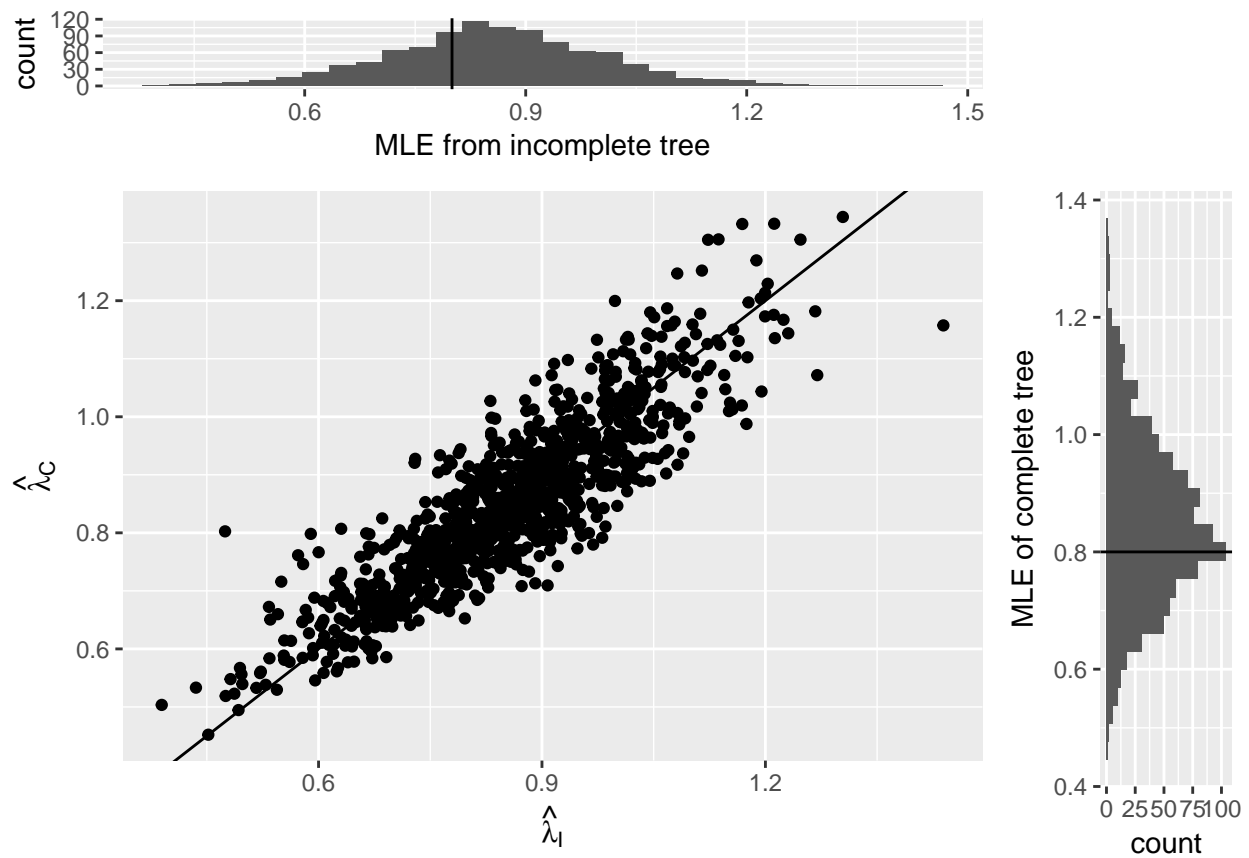
```
## elapsed
## 1067.92
```

```r
get.time(time)
```
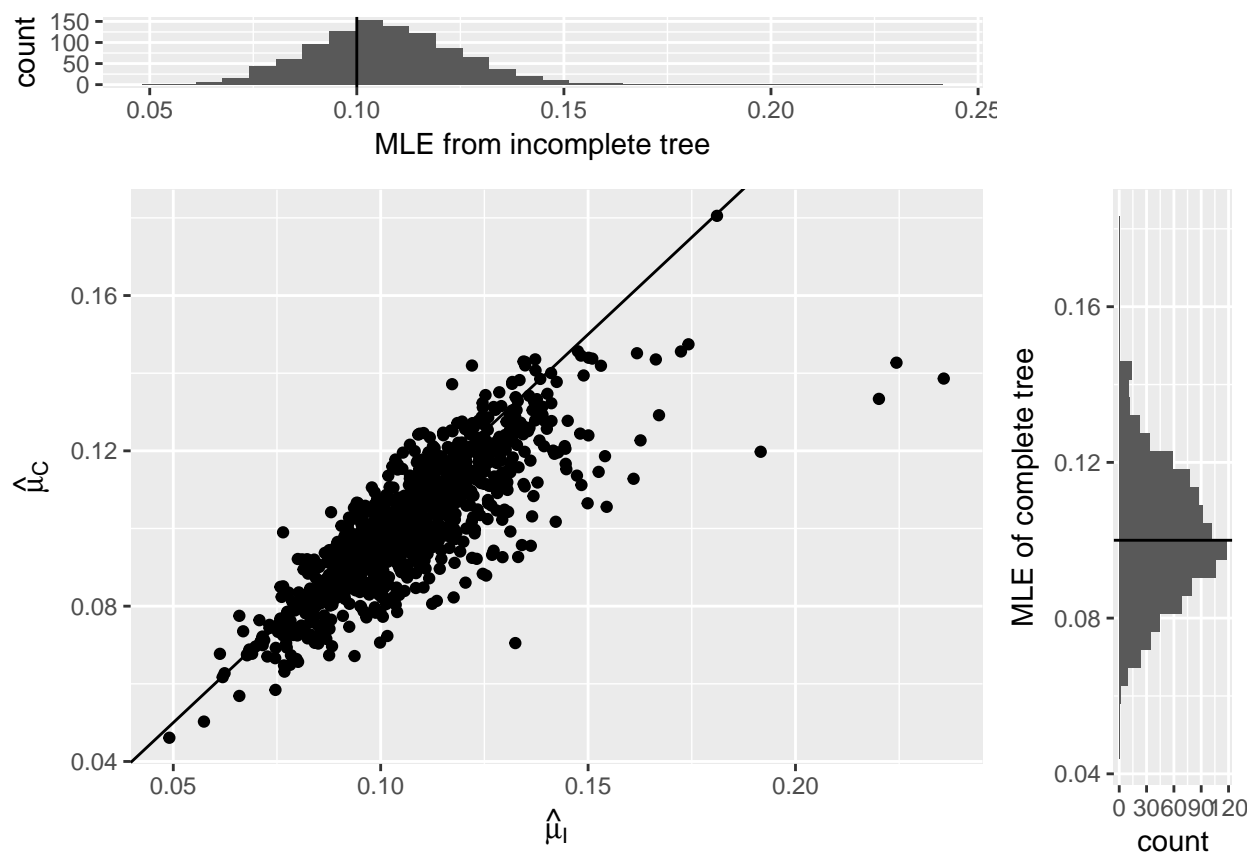
```
##  elapsed
## 1067.975
```

```r
dmea::par_est_vis(P=MP,par=1,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```
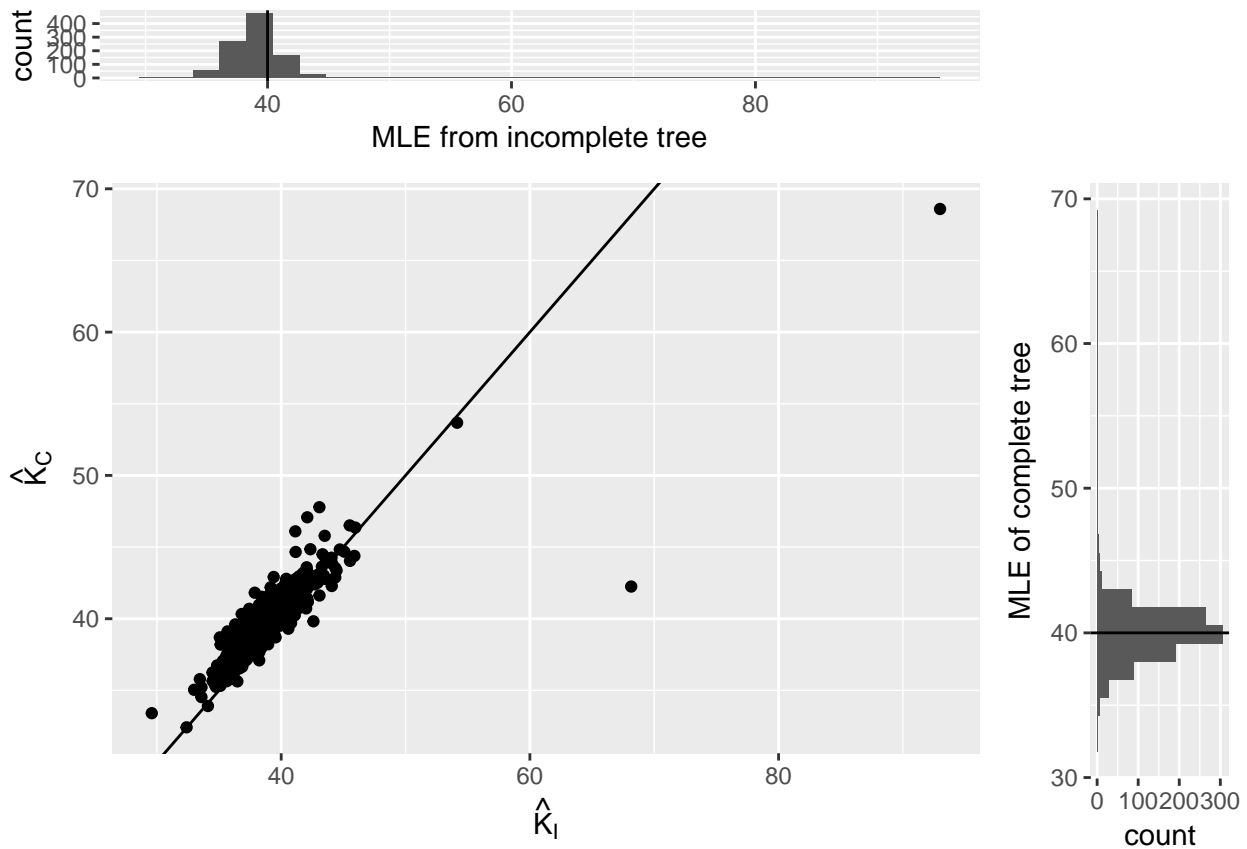
```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```

```
## [1] "0.003 proportion of data was excluded for vizualization purposes"
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```r
get.time(time)
```

```
##  elapsed
## 1072.548
```

```r
summary(MP)
```

```
##        V1               V2                V3
##  Min.   :0.3894   Min.   :0.04906   Min.   :24.74
##  1st Qu.:0.7670   1st Qu.:0.09504   1st Qu.:37.76
##  Median :0.8542   Median :0.10580   Median :38.93
##  Mean   :0.8558   Mean   :0.10722   Mean   :39.04
##  3rd Qu.:0.9468   3rd Qu.:0.11806   3rd Qu.:40.13
##  Max.   :1.4390   Max.   :0.23574   Max.   :92.99
```

```r
summary(RP)
```

```
##        V1               V2                V3
##  Min.   :0.4521   Min.   :0.04611   Min.   :3.200e+01
##  1st Qu.:0.7557   1st Qu.:0.08961   1st Qu.:3.900e+01
##  Median :0.8363   Median :0.10023   Median :4.000e+01
##  Mean   :0.8497   Mean   :0.10096   Mean   :2.314e+11
##  3rd Qu.:0.9381   3rd Qu.:0.11241   3rd Qu.:4.100e+01
##  Max.   :1.3443   Max.   :0.18053   Max.   :2.314e+14
```

$\mu_0 = 0.2$

```
time = proc.time()
n_sim = 1000
n_trees = 10
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.2,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)
```
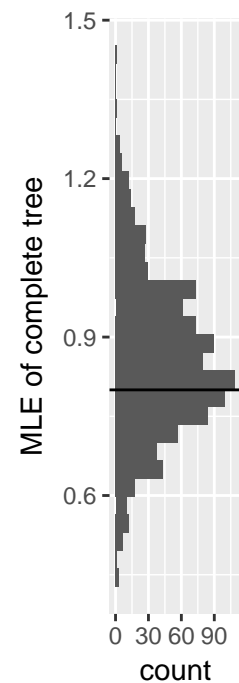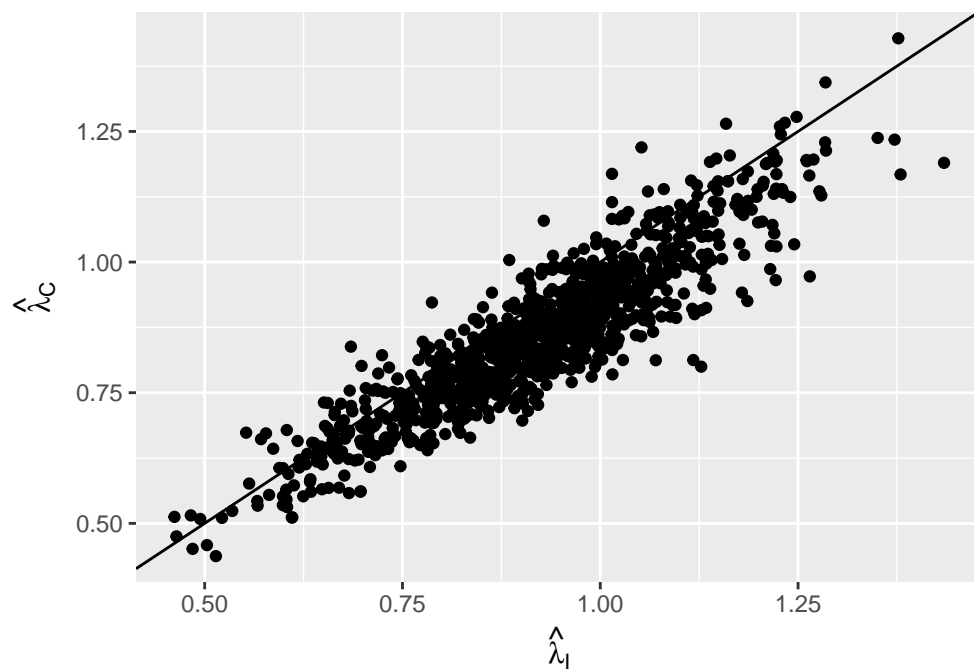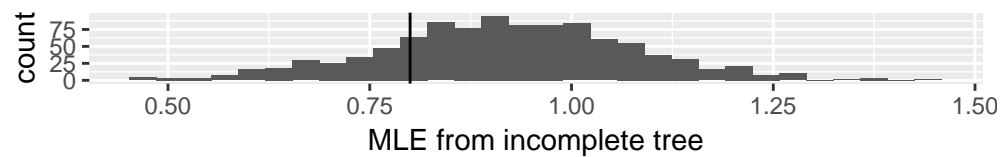
```
## elapsed
## 1865.548
```

```
get.time(time)
```
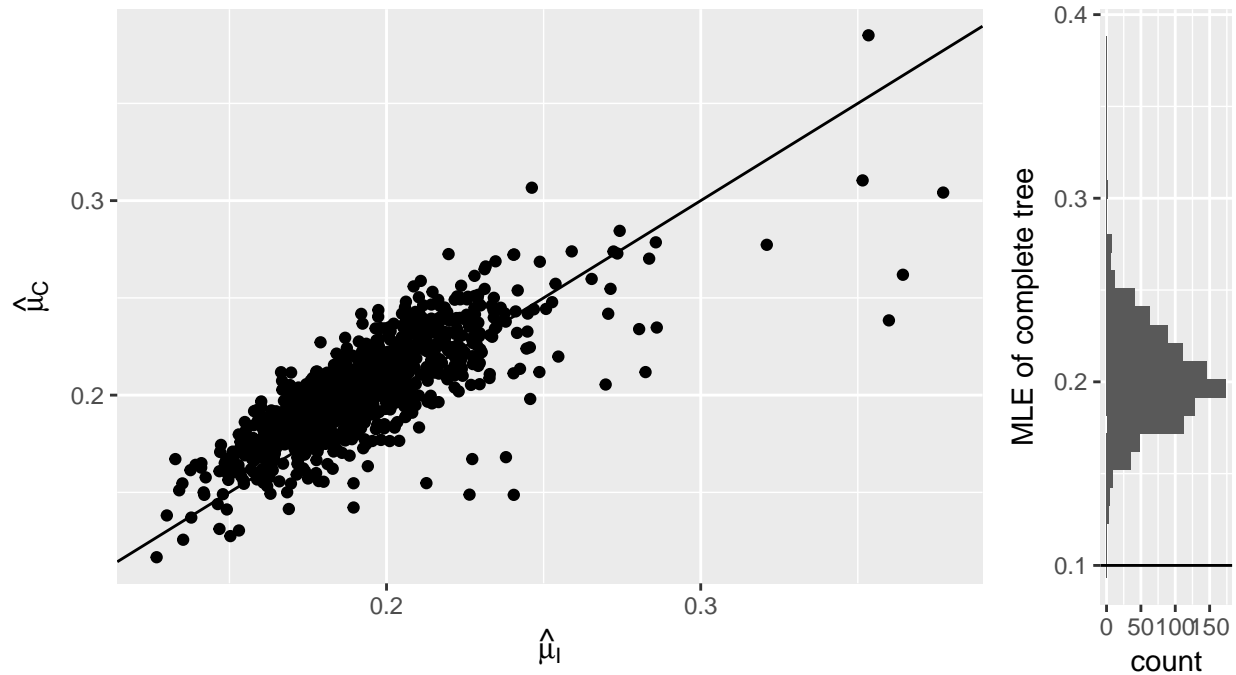
```
## elapsed
## 1865.562
```

```
dmea::par_est_vis(P=MP,par=1,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```
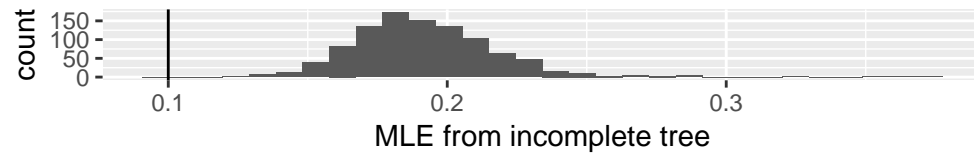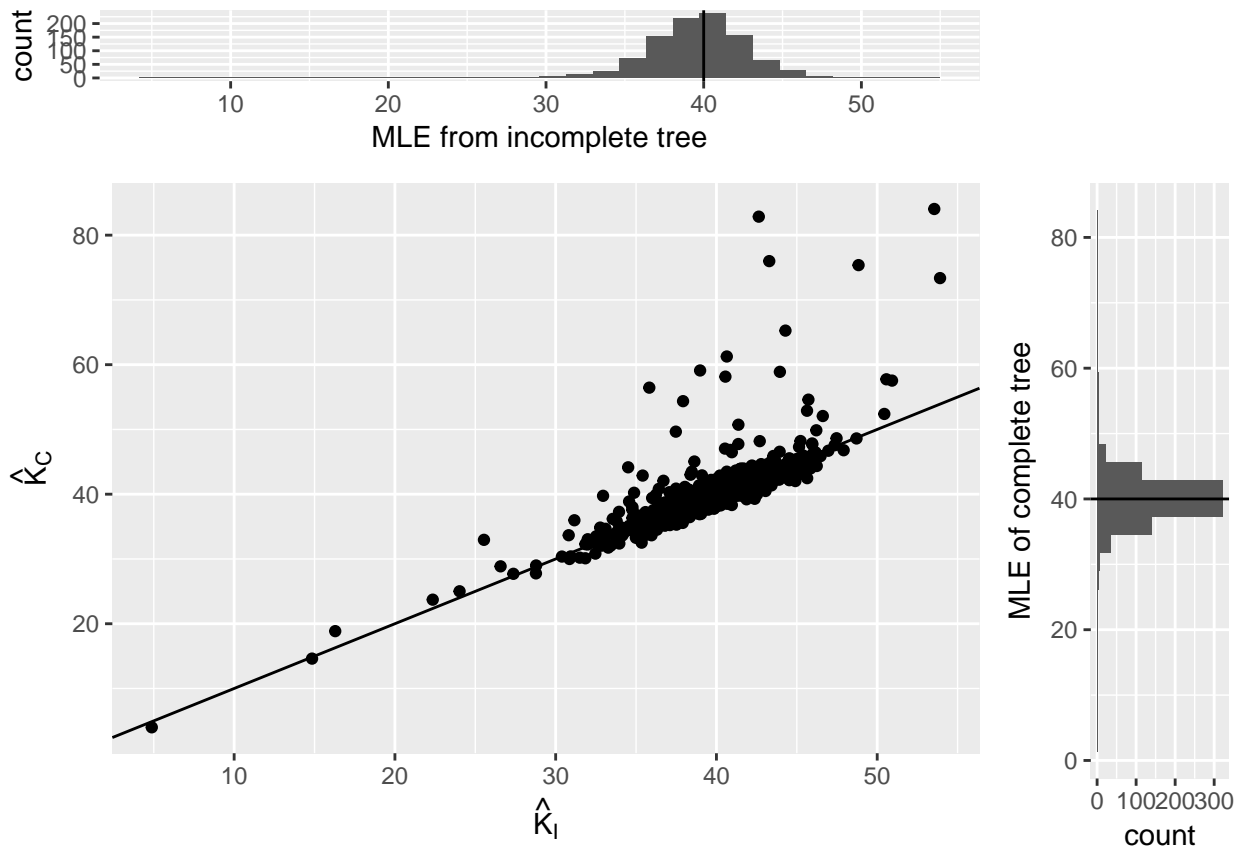
```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```

```
## [1] "0.00800000000000001 proportion of data was excluded for vizualization purposes"
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```r
summary(MP)
```

```
##       V1              V2              V3
##  Min.   :0.4618   Min.   :0.1268   Min.   : 4.876
##  1st Qu.:0.8207   1st Qu.:0.1750   1st Qu.:37.782
##  Median :0.9204   Median :0.1892   Median :39.754
##  Mean   :0.9190   Mean   :0.1924   Mean   :39.591
##  3rd Qu.:1.0188   3rd Qu.:0.2060   3rd Qu.:41.539
##  Max.   :1.4345   Max.   :0.3772   Max.   :54.987
```

```r
summary(RP)
```

```
##       V1              V2              V3
##  Min.   :0.4374   Min.   :0.1166   Min.   :4.000e+00
##  1st Qu.:0.7565   1st Qu.:0.1848   1st Qu.:3.800e+01
##  Median :0.8441   Median :0.2007   Median :4.000e+01
##  Mean   :0.8570   Mean   :0.2023   Mean   :3.283e+11
##  3rd Qu.:0.9517   3rd Qu.:0.2185   3rd Qu.:4.200e+01
##  Max.   :1.4282   Max.   :0.3850   Max.   :1.040e+14
```

$\mu_0 = 0.4$

```r
time = proc.time()
n_sim = 1000
n_trees = 10
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
```

```
p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.4,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)
```

```
##  elapsed
## 3232.704
```

```
get.time(time)
```
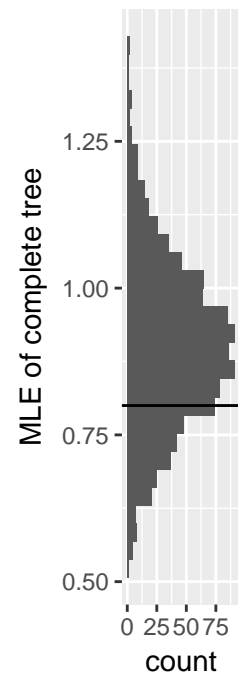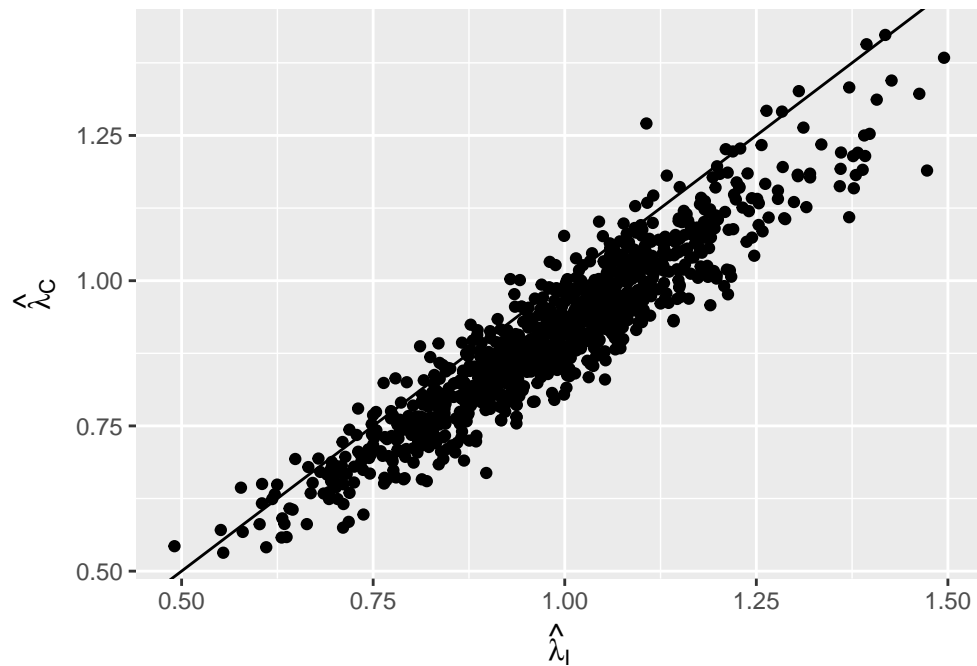
```
##  elapsed
## 3232.716
```

```
dmea::par_est_vis(P=MP,par=1,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```
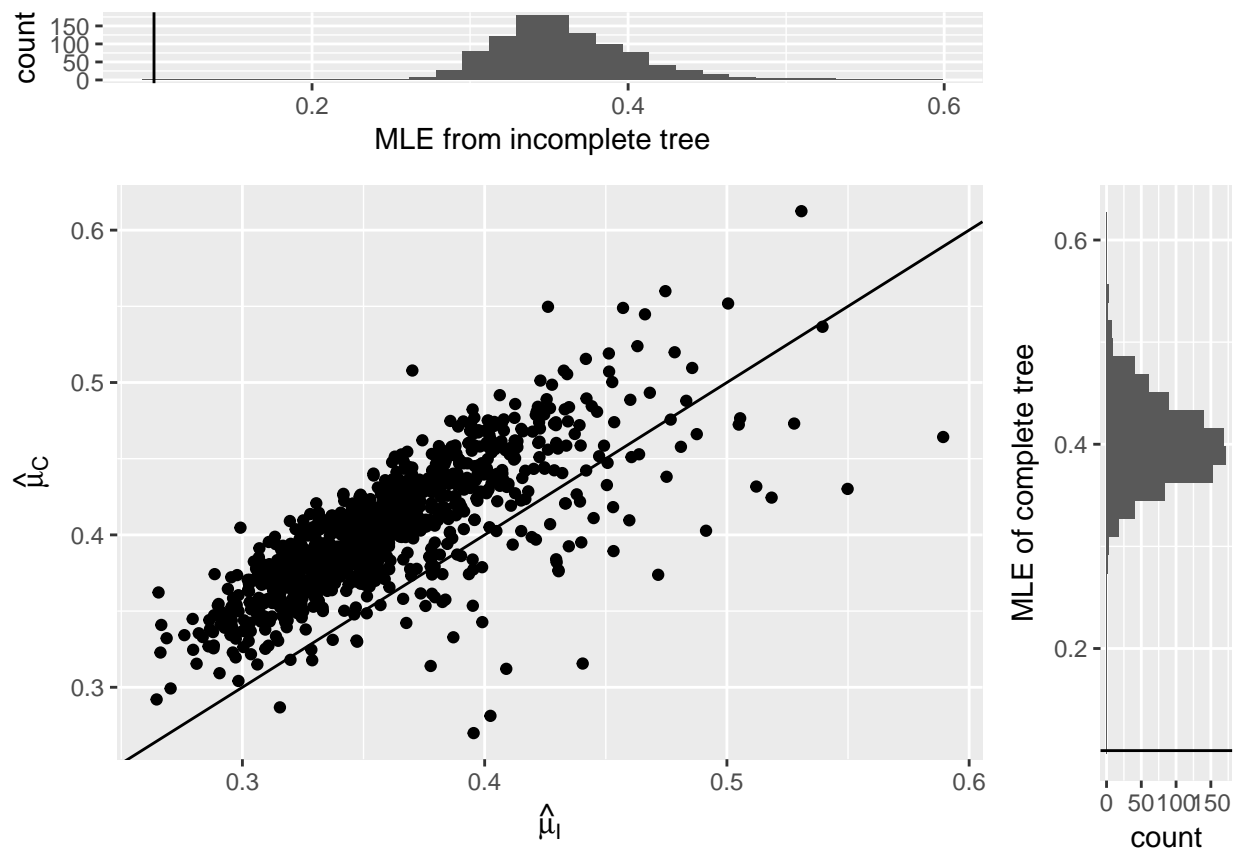


```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```
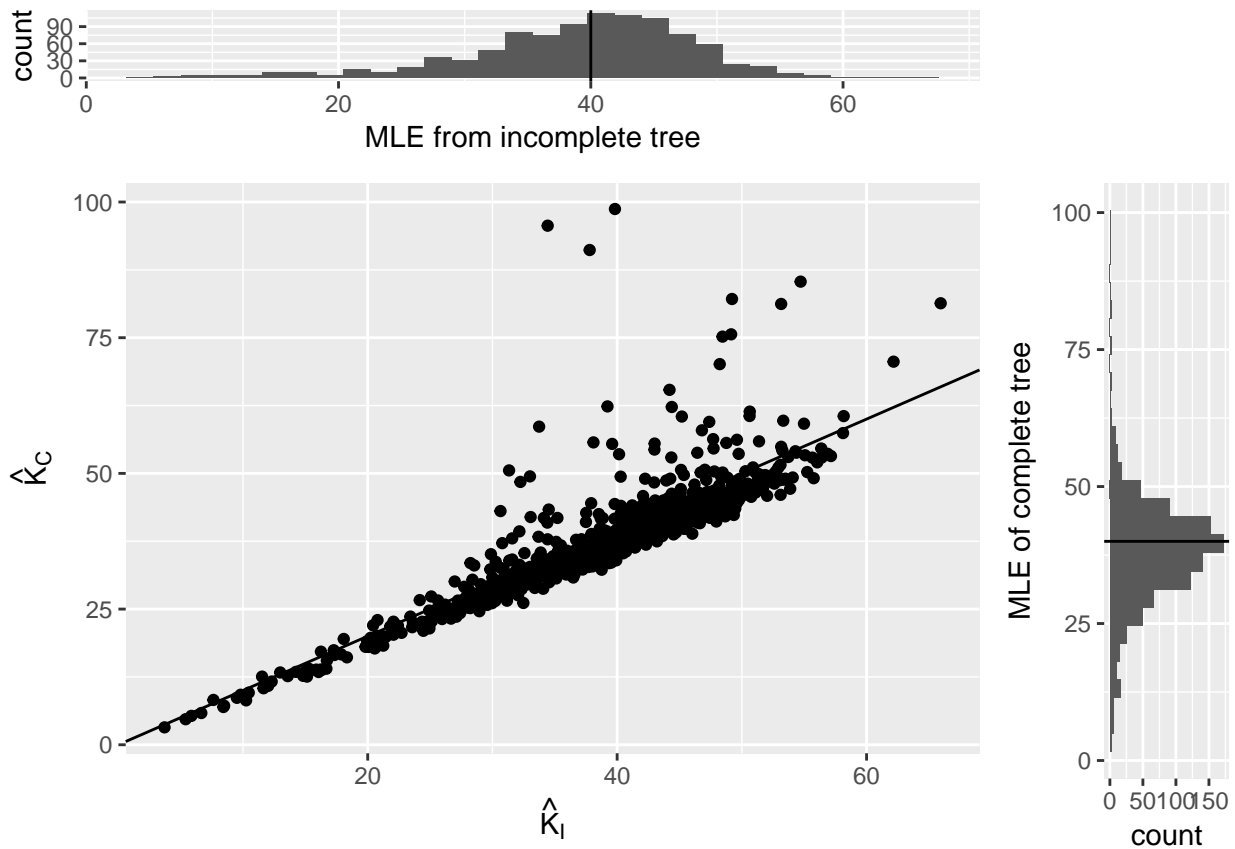
```
## [1] "0.032 proportion of data was excluded for vizualization purposes"
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```r
summary(MP)
```

```
##       V1                V2                V3
##  Min.   :0.4907   Min.   :0.2646   Min.   :  3.708
##  1st Qu.:0.8770   1st Qu.:0.3304   1st Qu.: 34.555
##  Median :0.9805   Median :0.3543   Median : 40.657
##  Mean   :0.9800   Mean   :0.3598   Mean   : 39.822
##  3rd Qu.:1.0736   3rd Qu.:0.3839   3rd Qu.: 45.265
##  Max.   :1.4950   Max.   :0.5893   Max.   :142.651
```

```r
summary(RP)
```

```
##       V1                V2                V3
##  Min.   :0.5317   Min.   :0.2699   Min.   :3.000e+00
##  1st Qu.:0.8051   1st Qu.:0.3757   1st Qu.:3.300e+01
##  Median :0.8962   Median :0.4009   Median :3.900e+01
##  Mean   :0.9015   Mean   :0.4030   Mean   :1.679e+12
##  3rd Qu.:0.9902   3rd Qu.:0.4285   3rd Qu.:4.400e+01
##  Max.   :1.4230   Max.   :0.6124   Max.   :4.773e+14
```

more trees

```r
time = proc.time()
n_sim = 1000
n_trees = 100
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
```

10

```
p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.1,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
print(proc.time()-p)
```

```
##     user  system elapsed
## 8044.632   0.156 8045.623
```

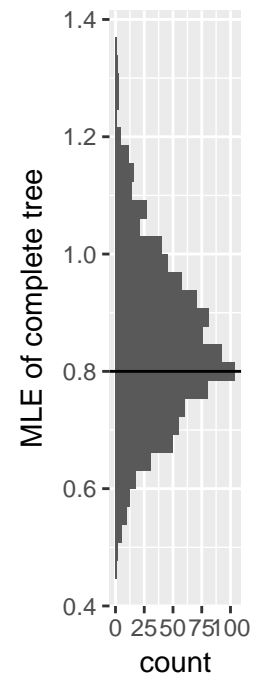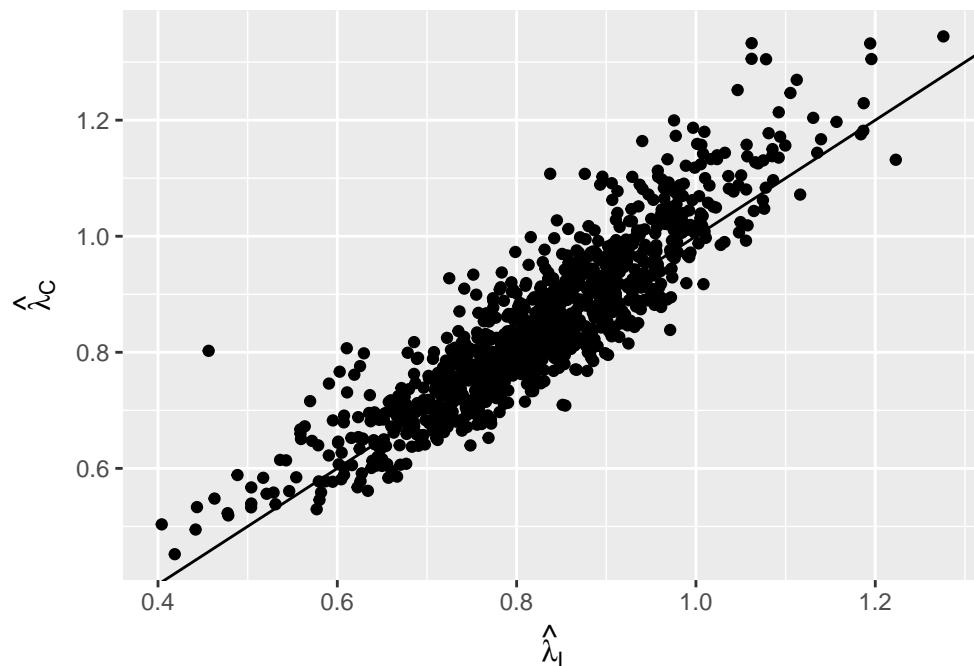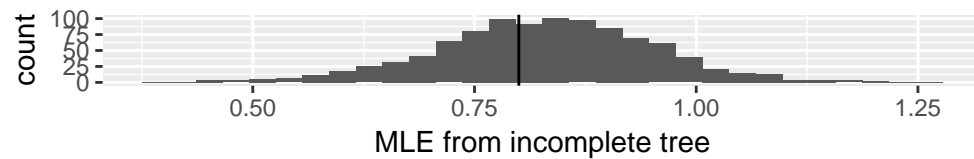```
get.time(time)
```

```
##  elapsed
## 8045.629
```

```
dmea::par_est_vis(P=MP,par=1,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```
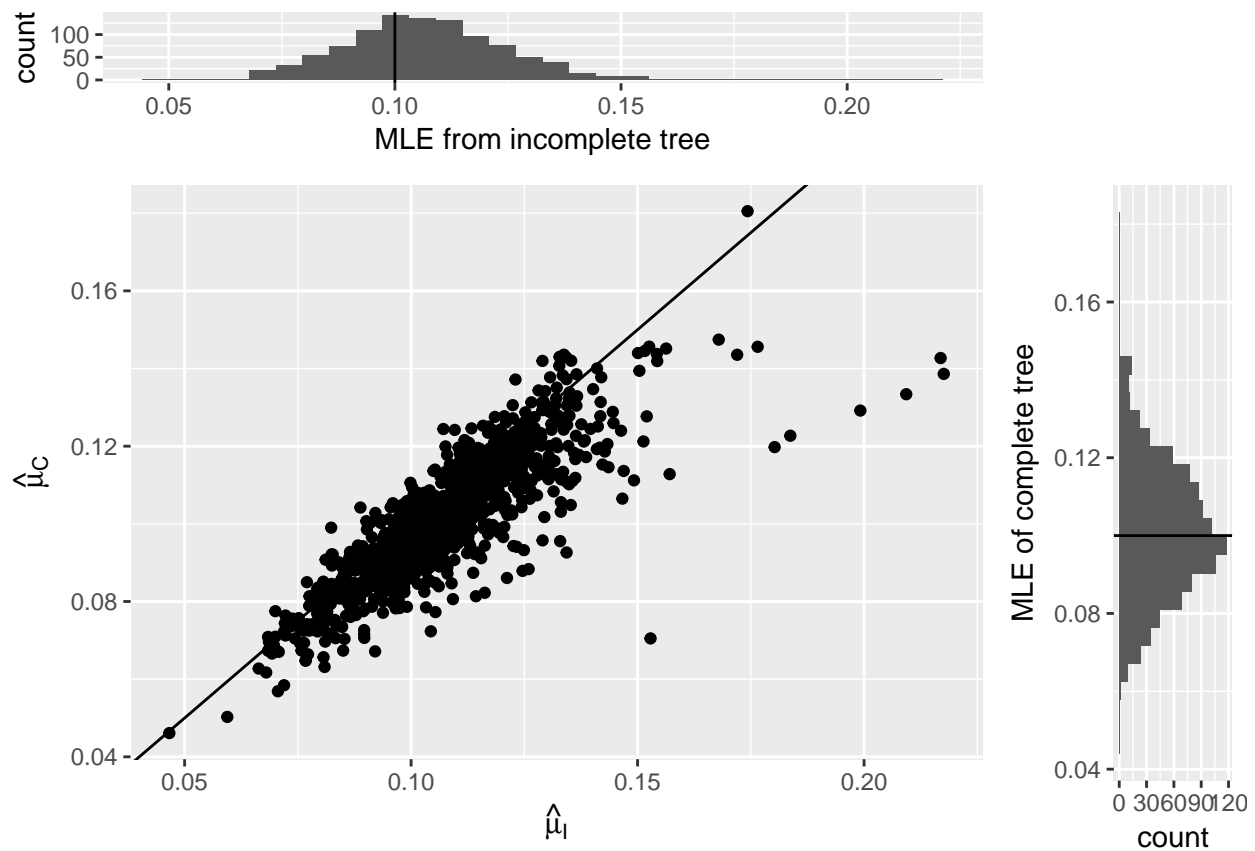


```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```
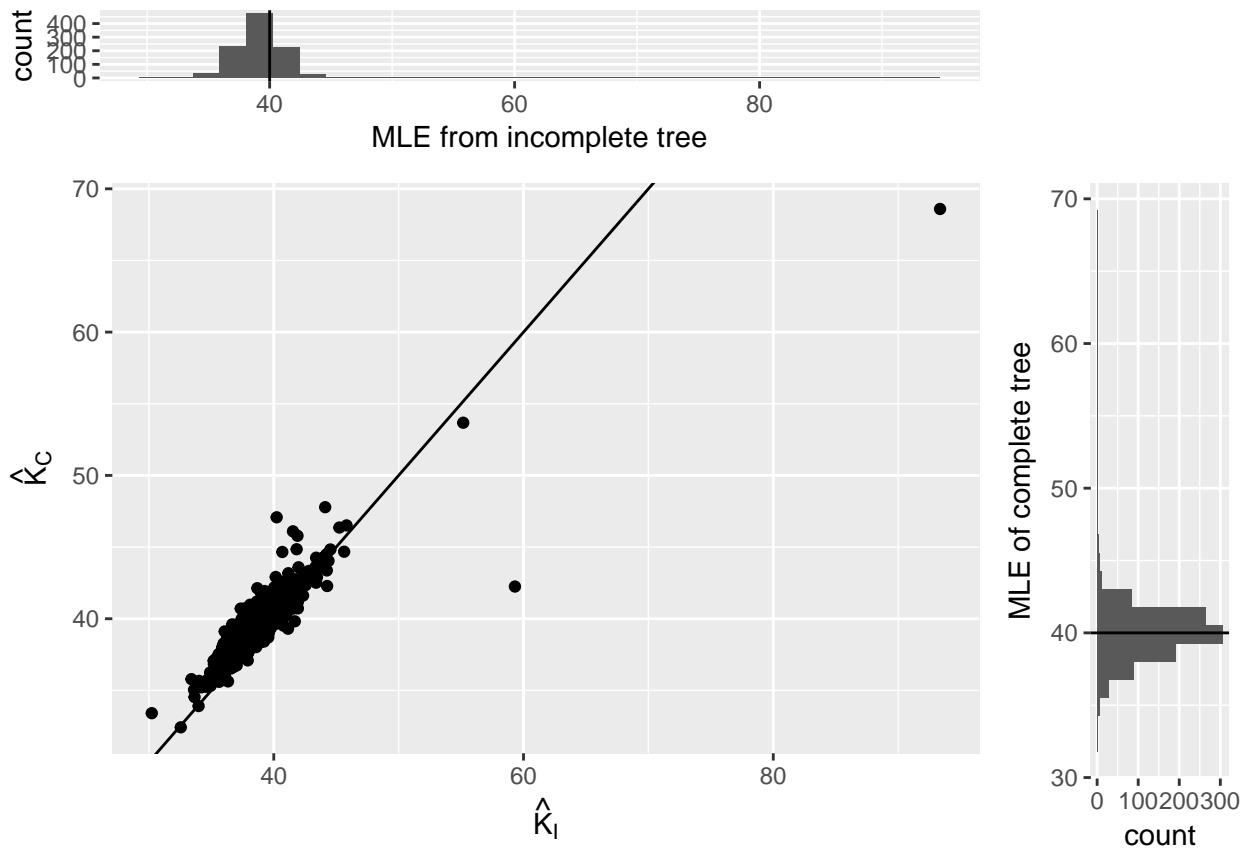
```
## [1] "0.003 proportion of data was excluded for vizualization purposes"
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```r
summary(MP)
```

```
##       V1               V2                V3
##  Min.   :0.4042   Min.   :0.04663   Min.   :30.23
##  1st Qu.:0.7543   1st Qu.:0.09528   1st Qu.:37.92
##  Median :0.8295   Median :0.10581   Median :39.20
##  Mean   :0.8288   Mean   :0.10716   Mean   :39.23
##  3rd Qu.:0.9107   3rd Qu.:0.11774   3rd Qu.:40.29
##  Max.   :1.2760   Max.   :0.21760   Max.   :93.36
```

```r
summary(RP)
```

```
##       V1               V2                V3
##  Min.   :0.4521   Min.   :0.04611   Min.   :3.200e+01
##  1st Qu.:0.7557   1st Qu.:0.08961   1st Qu.:3.900e+01
##  Median :0.8363   Median :0.10023   Median :4.000e+01
##  Mean   :0.8497   Mean   :0.10096   Mean   :2.314e+11
##  3rd Qu.:0.9381   3rd Qu.:0.11241   3rd Qu.:4.100e+01
##  Max.   :1.3443   Max.   :0.18053   Max.   :2.314e+14
```

more trees

```r
time = proc.time()
n_sim = 1000
n_trees = 100
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
```

```
p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.4,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)
```

```
## elapsed
## 27009.56
```

```
get.time(time)
```
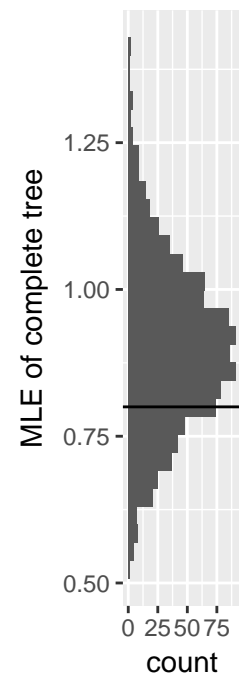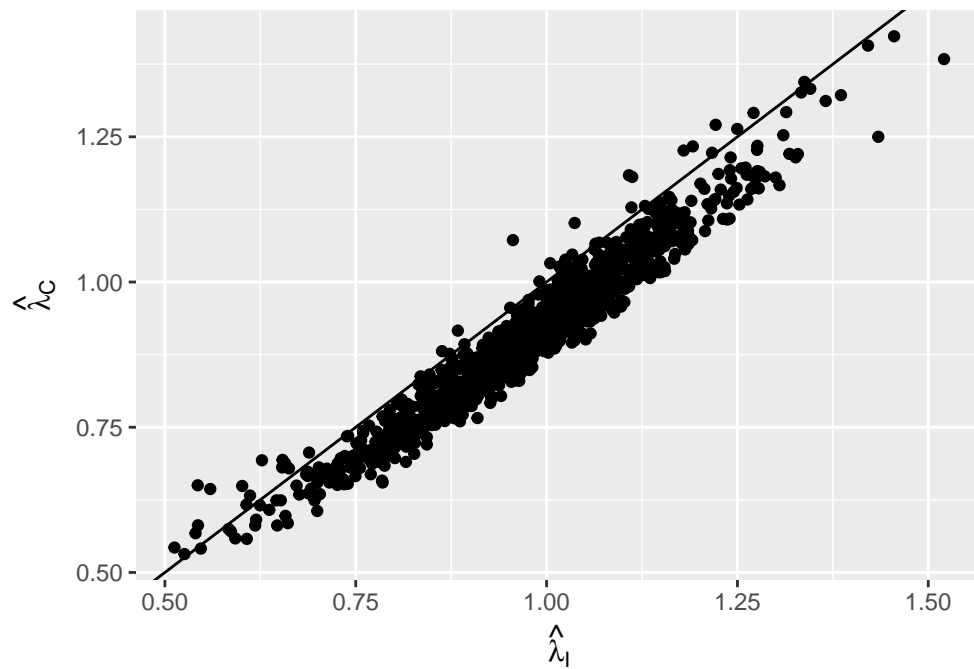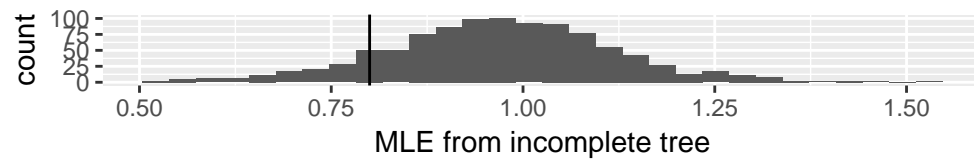
```
## elapsed
## 27009.57
```

```
dmea::par_est_vis(P=MP,par=1,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```
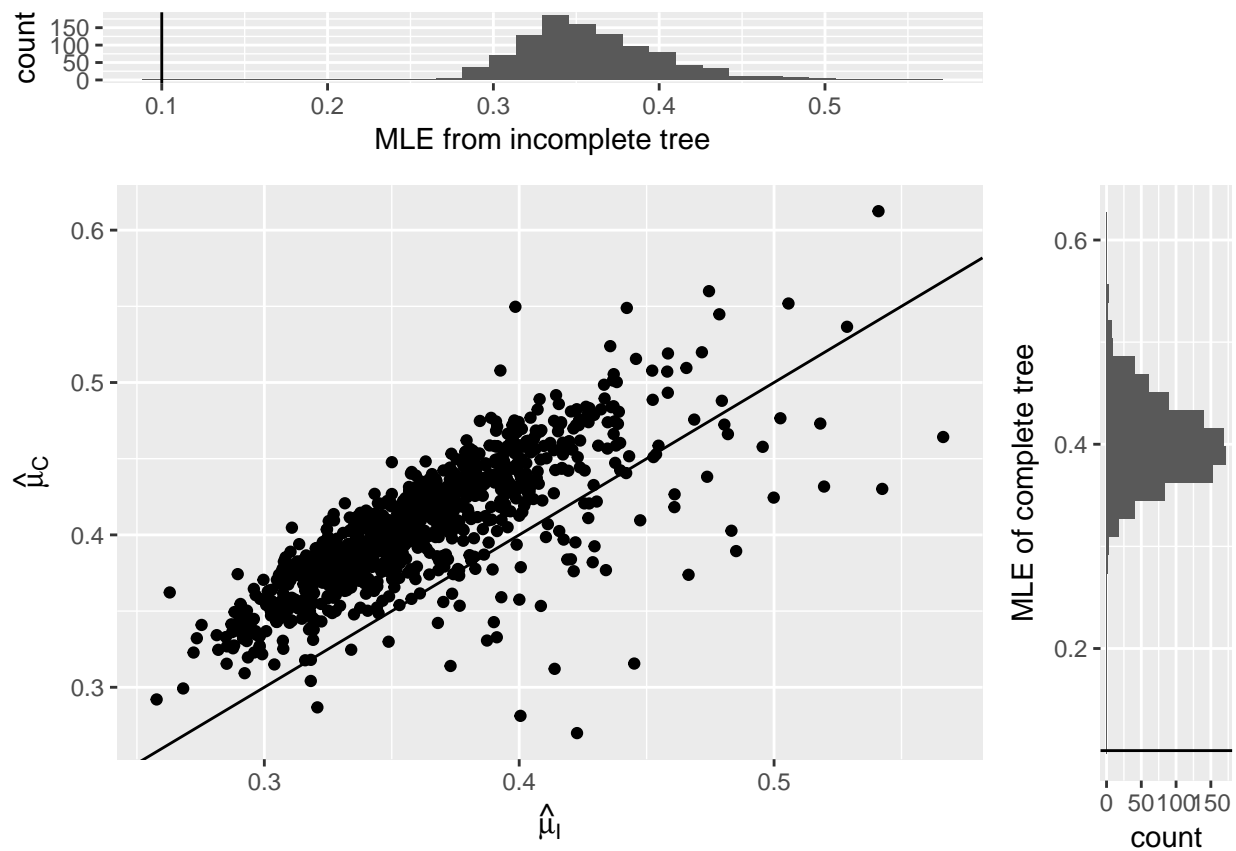


```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```
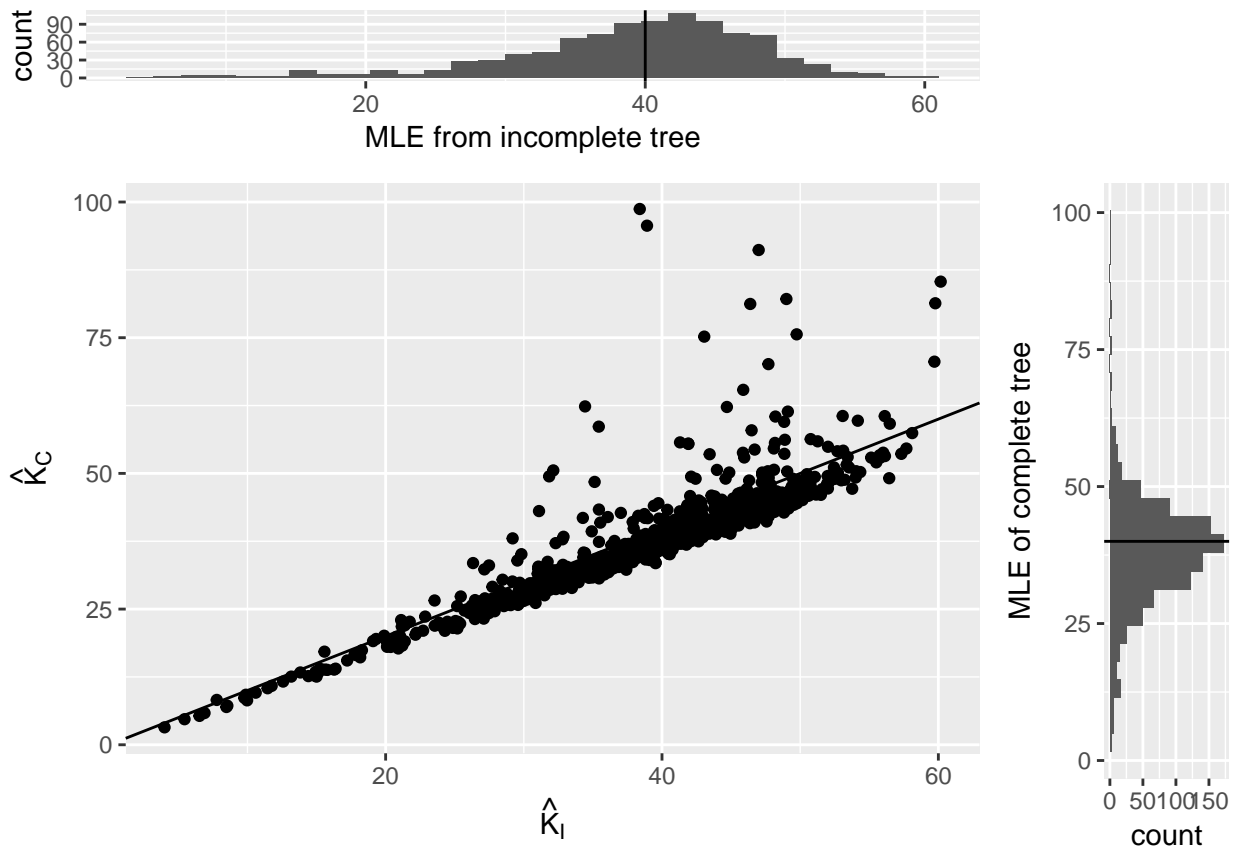
```
## [1] "0.032 proportion of data was excluded for vizualization purposes"
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
get.time(time)
```

```
## elapsed
## 27012.65
```

```
summary(MP)
```

```
##        V1              V2              V3
## Min.   :0.5126   Min.   :0.2577   Min.   :  3.998
## 1st Qu.:0.8771   1st Qu.:0.3310   1st Qu.: 34.887
## Median :0.9694   Median :0.3533   Median : 40.761
## Mean   :0.9690   Mean   :0.3596   Mean   : 40.281
## 3rd Qu.:1.0633   3rd Qu.:0.3837   3rd Qu.: 45.622
## Max.   :1.5207   Max.   :0.5664   Max.   :165.823
```

```
summary(RP)
```

```
##        V1              V2              V3
## Min.   :0.5317   Min.   :0.2699   Min.   :3.000e+00
## 1st Qu.:0.8051   1st Qu.:0.3757   1st Qu.:3.300e+01
## Median :0.8962   Median :0.4009   Median :3.900e+01
## Mean   :0.9015   Mean   :0.4030   Mean   :1.679e+12
## 3rd Qu.:0.9902   3rd Qu.:0.4285   3rd Qu.:4.400e+01
## Max.   :1.4230   Max.   :0.6124   Max.   :4.773e+14
```