```
R version 2.14.1 (2011-12-22)
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Platform: x86_64-pc-mingw32/x64 (64-bit)


> library(MEMSS)
Loading required package: lme4
Loading required package: Matrix
Loading required package: lattice


Attaching package: 'Matrix'

The following object(s) are masked from 'package:base':

    det


Attaching package: 'lme4'

The following object(s) are masked from 'package:stats':

    AIC, BIC

Warning message:
package 'MEMSS' was built under R version 2.14.2
> head(Orange) #get data
  Tree  age circumference
1    A  118            30
2    A  484            58
3    A  664            87
4    A 1004           115
5    A 1231           120
6    A 1372           142


>   xyplot(circumference ~ age | Tree, Orange, type = c("g","b"),
+   index = function(x,y) coef(lm(y ~ x))[1],
+   xlab = "Age - 1968/12/31",
+   ylab = "Circumference (mm)", aspect = "xy")
> # connect-the-dots, frame-by-frame


> # connect-the-dots, all 5 trees
> xyplot(circumference ~ age, Orange, groups = Tree, type = c("g", "b"),
+  auto.key = list(space = "right", lines = TRUE), aspect = "xy",
+  xlab = "Age (days since 1968/12/31)", ylab = "Circumference (mm)")

> ?SSlogis
starting httpd help server ... done

> # random asymptote model, provide starting values
> m1 <- nlmer(circumference ~ SSlogis(age, Asym, xmid, scal) ~ Asym|Tree,
+  Orange, start = c(Asym = 190, xmid = 730, scal = 350))
>  print(m1)
Nonlinear mixed model fit by the Laplace approximation
Formula: circumference ~ SSlogis(age, Asym, xmid, scal) ~ Asym | Tree
   Data: Orange
  AIC  BIC logLik deviance
 1901 1908 -945.3     1891
Random effects:
 Groups   Name Variance  Std.Dev.
 Tree     Asym 53985.687 232.348
 Residual        52.868    7.271
Number of obs: 35, groups: Tree, 5

Fixed effects:
     Estimate Std. Error t value
Asym   192.04     104.09   1.845
xmid   727.89      31.97  22.771
scal   347.97      24.42  14.252


Correlation of Fixed Effects:
     Asym  xmid
xmid 0.053
```
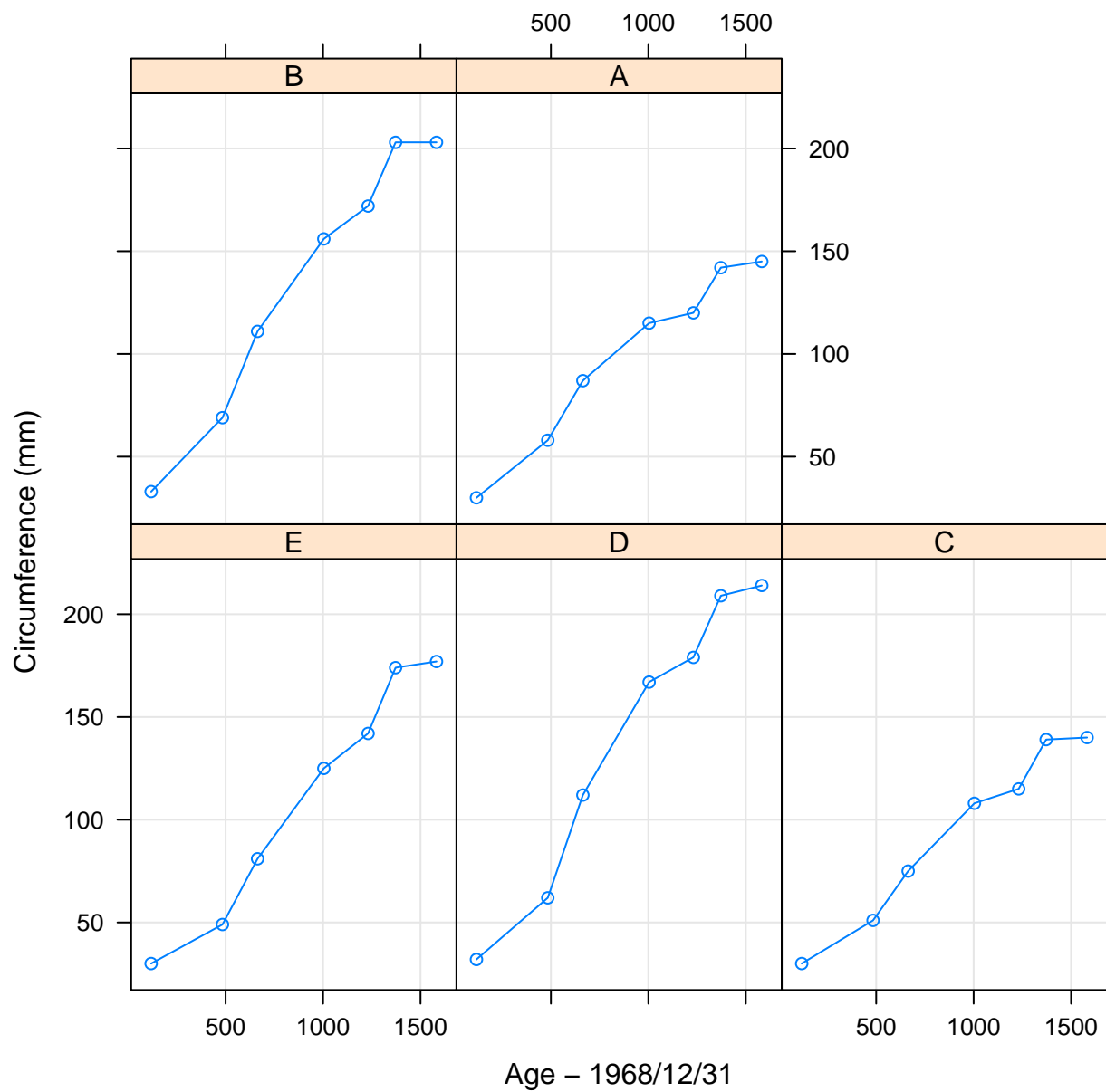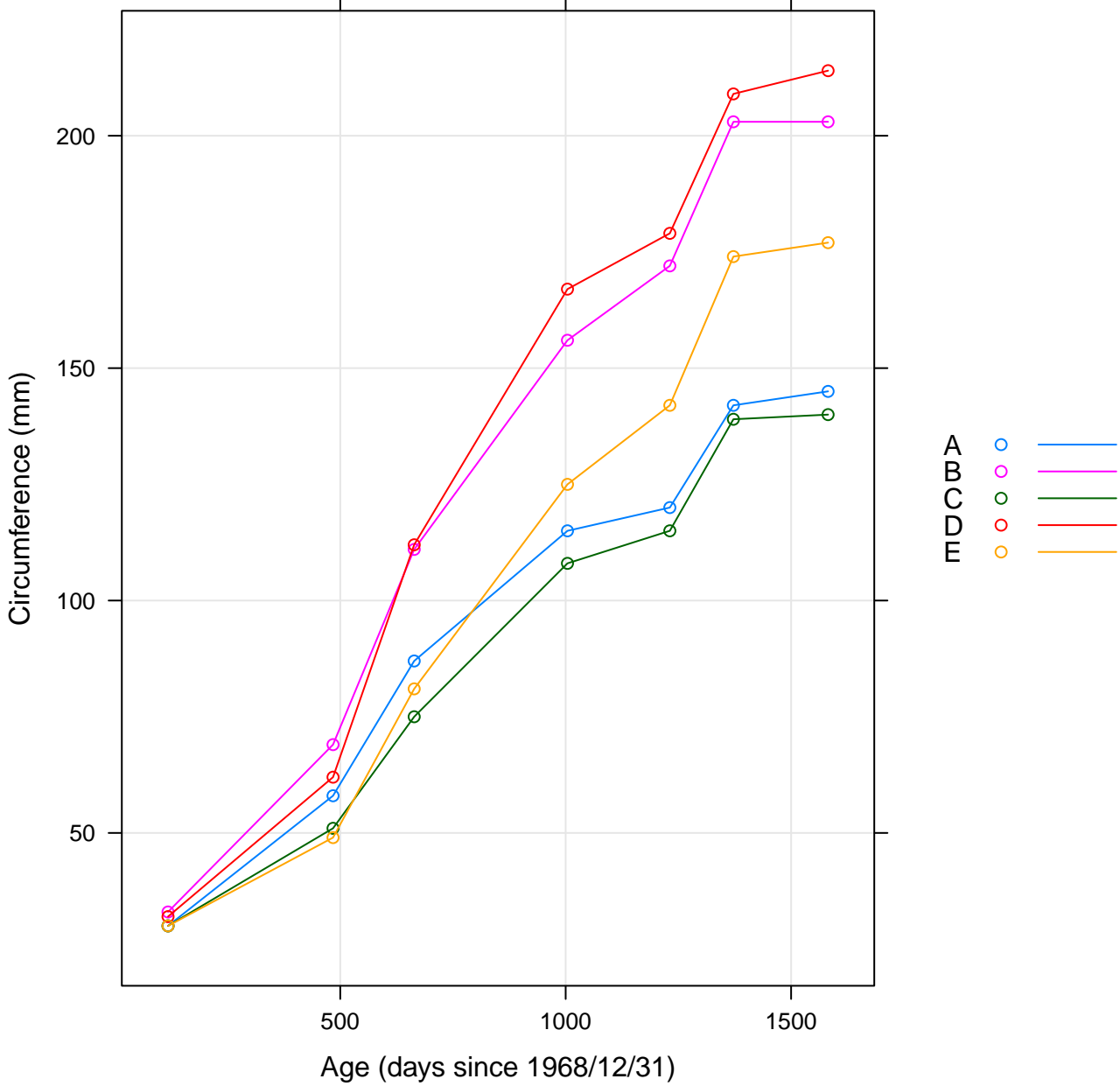
```
scal 0.050 0.763
> ranef(m1)
$Tree
        Asym
A -30.143978
B  32.352056
C -37.925243
D  41.016168
E  -5.299086

> fixef(m1)
    Asym     xmid      scal
192.0410 727.8908 347.9680


> #Independent random effects for each parameter
> nm2 <- nlmer(circumference ~ SSlogis(age, Asym, xmid, scal) ~
+                     (Asym | Tree) + (xmid | Tree) + (scal|Tree), Orange,
+                     start = c(Asym = 200, xmid = 770, scal = 120)),
Error: unexpected ',' in:
"                    (Asym | Tree) + (xmid | Tree) + (scal|Tree), Orange,
                    start = c(Asym = 200, xmid = 770, scal = 120)),"
>       corr = FALSE)
Error: unexpected ')' in "      corr = FALSE)"
> nm2 <- nlmer(circumference ~ SSlogis(age, Asym, xmid, scal) ~
+                     (Asym | Tree) + (xmid | Tree) + (scal|Tree), Orange,
+                     start = c(Asym = 200, xmid = 770, scal = 120))

> print(nm2)
Nonlinear mixed model fit by the Laplace approximation
Formula: circumference ~ SSlogis(age, Asym, xmid, scal) ~ (Asym | Tree) +  (xmid | Tree) + (scal | Tree)
   Data: Orange
  AIC  BIC logLik deviance
 1381 1392 -683.6     1367
Random effects:
 Groups   Name Variance   Std.Dev.
 Tree     Asym  34037.991 184.4939
 Tree     xmid 201573.121 448.9690
 Tree     scal  42152.968 205.3119
 Residual         36.817   6.0677
Number of obs: 35, groups: Tree, 5

Fixed effects:
     Estimate Std. Error t value
Asym   192.77      82.69   2.331
xmid   726.14     203.17   3.574
scal   355.44      94.71   3.753

Correlation of Fixed Effects:
     Asym   xmid
xmid 0.009
scal 0.014 0.029

> anova(nm2,m1)
Data: Orange
Models:
m1: circumference ~ SSlogis(age, Asym, xmid, scal) ~ Asym | Tree
nm2: circumference ~ SSlogis(age, Asym, xmid, scal) ~ (Asym | Tree) +
nm2:     (xmid | Tree) + (scal | Tree)
    Df    AIC    BIC  logLik  Chisq Chi Df Pr(>Chisq)
m1   5 1900.6 1908.4 -945.31
nm2  7 1381.2 1392.1 -683.62 523.38      2  < 2.2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> ranef(nm2)
$Tree
       Asym       xmid        scal
A -38.24274 -96.198290   8.725296
B  26.38468 -25.135563 -22.259975
C -34.66581   4.204902  41.263462
D  32.80133 -14.454234 -51.113890
E  13.21907 128.902165  20.808136

> fixed(nm2)
Error: could not find function "fixed"
```

```
> fixef(nm2)
    Asym     xmid     scal
192.7677 726.1407 355.4370
> #Correlated random effects for Asym and scal only
> nm3 <- nlmer(circumference ~ SSlogis(age, Asym, xmid, scal) ~
+                   (Asym + scal|Tree), Orange,
+                   start = c(Asym = 200, xmid = 770, scal = 120))
> print(nm3)
Nonlinear mixed model fit by the Laplace approximation
Formula: circumference ~ SSlogis(age, Asym, xmid, scal) ~ (Asym + scal |      Tree)
   Data: Orange
  AIC  BIC logLik deviance
 1573 1584 -779.7     1559
Random effects:
 Groups   Name Variance  Std.Dev. Corr
 Tree     Asym 36734.900 191.6635
          scal 93569.160 305.8908 -0.680
 Residual       42.887   6.5488
Number of obs: 35, groups: Tree, 5

Fixed effects:
     Estimate Std. Error t value
Asym   194.09      85.89   2.260
xmid   735.97      28.75  25.595
scal   365.99     138.73   2.638

Correlation of Fixed Effects:
     Asym   xmid
xmid  0.058
scal -0.660  0.120
> ranef(nm3)
$Tree
       Asym       scal
A -24.457746  69.93741
B  32.088680 -12.03847
C -35.066052  35.87508
D  36.585858 -47.24177
E  -9.175625 -46.86463

>
```