ts

- :

depart.txt 1984 1 1988 12 . scan() R . scan()
R .

```
depart <- scan("https://raw.githubusercontent.com/yjyjpark/TS-with-R/main/Data/depart.txt")
```

depart ts() ts .

```
depart.ts <- ts(depart, start = c(1984, 1), frequency = 12)
depart.ts
##       Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec
## 1984  423  458  607  564  536  536  804  540  488  627  672 1447
## 1985  514  518  699  654  612  612  884  605  547  705  698 1555
## 1986  561  564  773  717  665  667  994  661  616  786  806 1754
## 1987  622  636  874  831  769  779 1142  764  718  930  943 2039
## 1988  736  752 1057  947  868  931 1311  896  867 1073 1069 2333
```

- :

depart.ts Figure 1 .

```
library(fpp2)
autoplot(depart.ts) +
  labs(title = "Monthly sales of a department store",
       x = "Year", y = NULL)
```

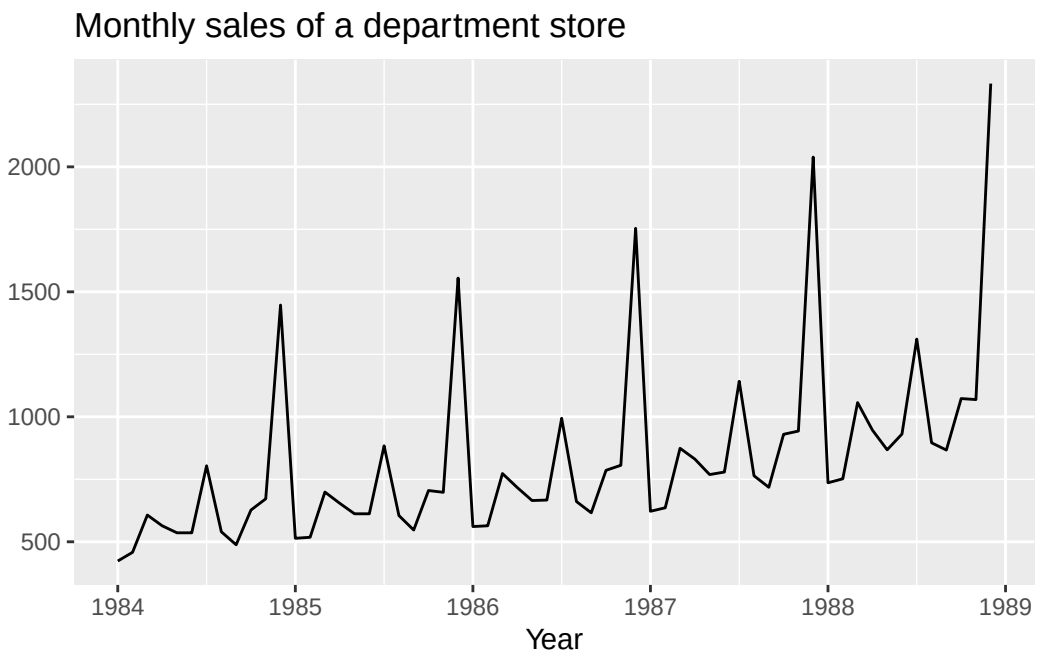


Figure 1:

- :

1856 1 2005 12 `global.txt` . Figure 2 .

```
global <- scan("https://raw.githubusercontent.com/yjyjpark/TS-with-R/main/Data/global.txt")
global.ts <- ts(global, start = c(1856, 1), frequency = 12)
```

```
autoplot(global.ts) +
  labs(title = "Global Temperature 1985 ~ 2005",
       x = "Year", y = NULL)
```

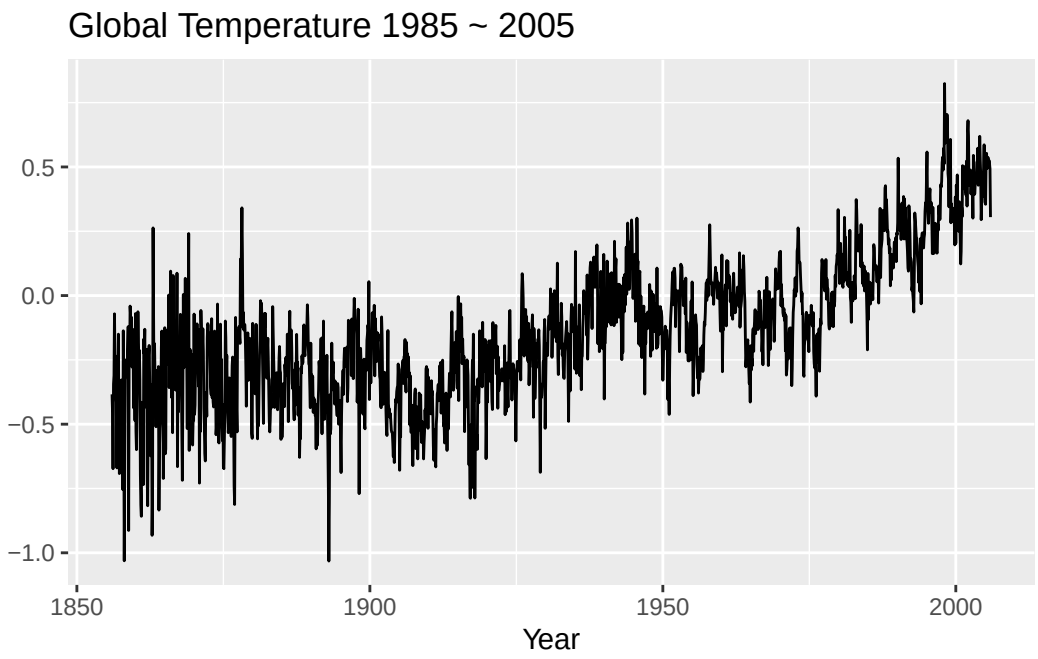


Figure 2: 1856 2005

Figure 2 1970 . 1970 . ts , window() .

```
global.1970 <- window(global.ts, start = 1970)
```

1970 1 Figure 3 .

```
autoplot(global.1970) +
  labs(title = "Global Temperature 1970 ~ 2005",
       x = "Year", y = NULL)
```

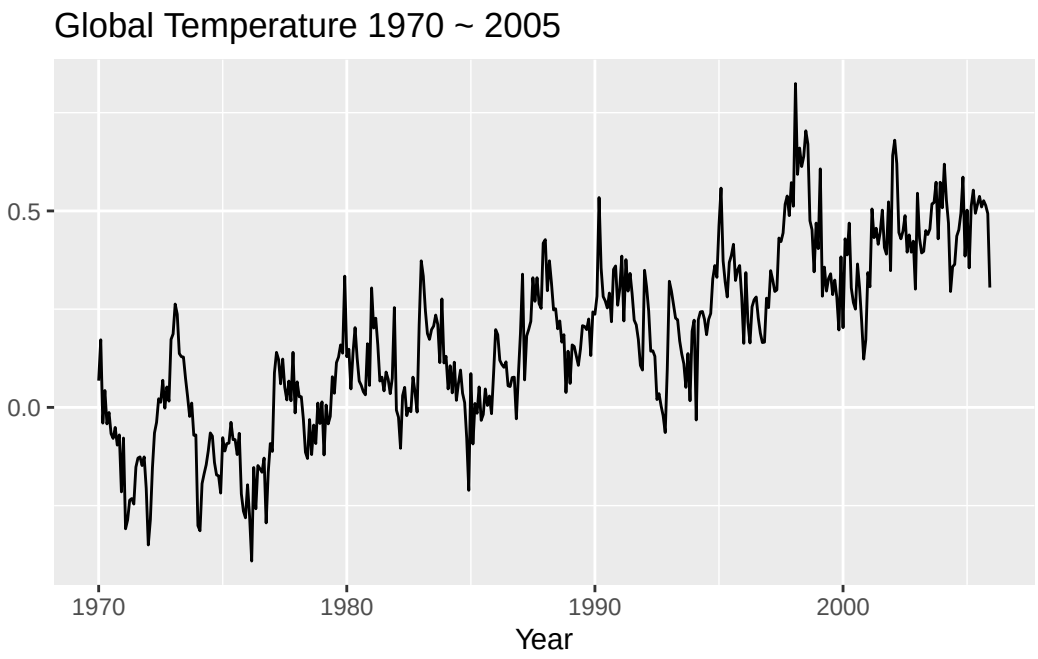


Figure 3: 1970 2005

Figure 3 , . Figure 4 .

```
autoplot(global.1970) +
  geom_smooth(method = "lm", se = FALSE) +
  labs(title = "Global Temperature 1970 ~ 2005",
       x = "Year", y = NULL)
```

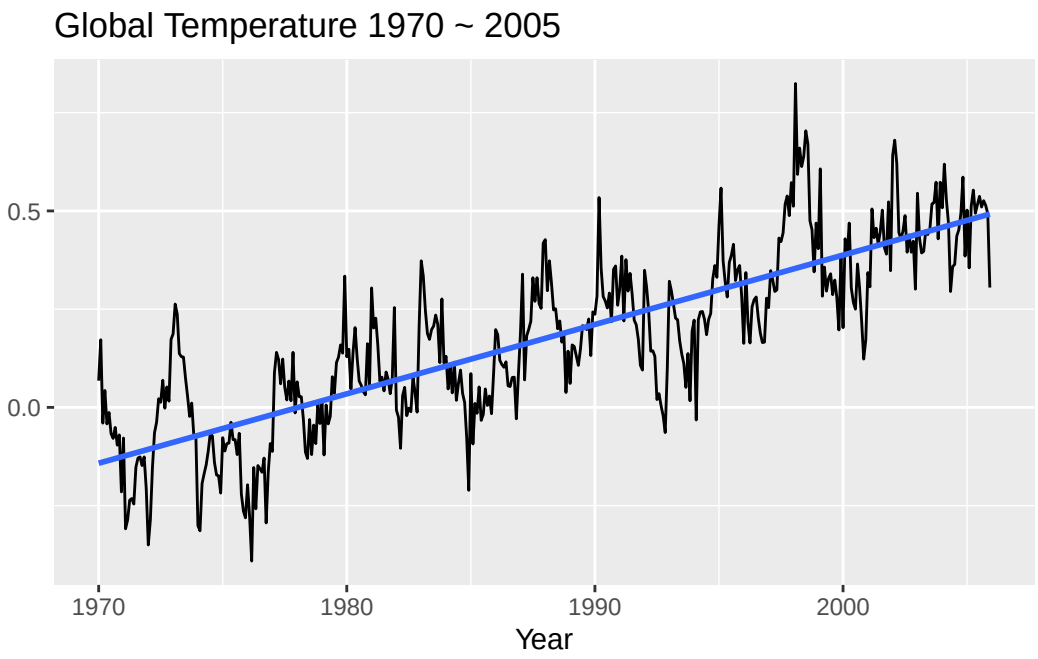


Figure 4:

- :

cbe.txt 1958 , . , .
readr read_table() .

```
library(readr)
CBE <- read_table("https://raw.githubusercontent.com/yjyjpark/TS-with-R/main/Data/cbe.txt")
CBE %>% print(n = 3)
## # A tibble: 396 x 3
##    choc  beer  elec
##   <dbl> <dbl> <dbl>
## 1  1451  96.3  1497
## 2  2037  84.4  1463
## 3  2477  91.2  1648
## # i 393 more rows
```

tibble ts . ts() ts .

```
cbe <- ts(CBE, start = 1958, frequency = 12)
head(CBE, n = 3)
## # A tibble: 3 x 3
```

```
##    choc  beer  elec
##   <dbl> <dbl> <dbl>
## 1  1451  96.3  1497
## 2  2037  84.4  1463
## 3  2477  91.2  1648
```

cbe choc, beer elec . autoplot() Figure 5 .

```
autoplot(cbe) + ylab(NULL)
```

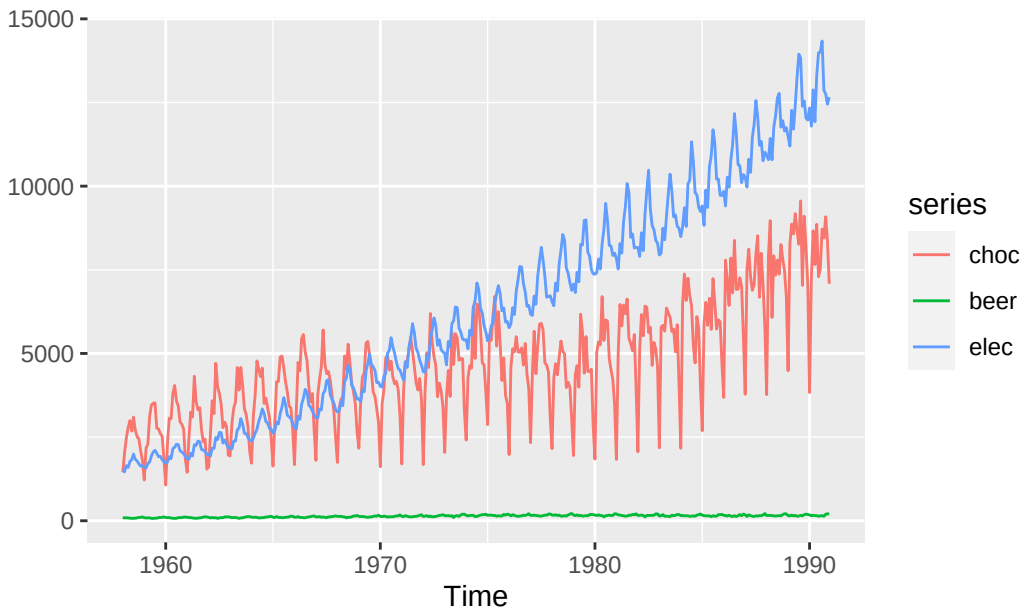


Figure 5:

scale facet . Facet Figure 6 .

```
autoplot(cbe, facets = TRUE) + ylab(NULL)
```

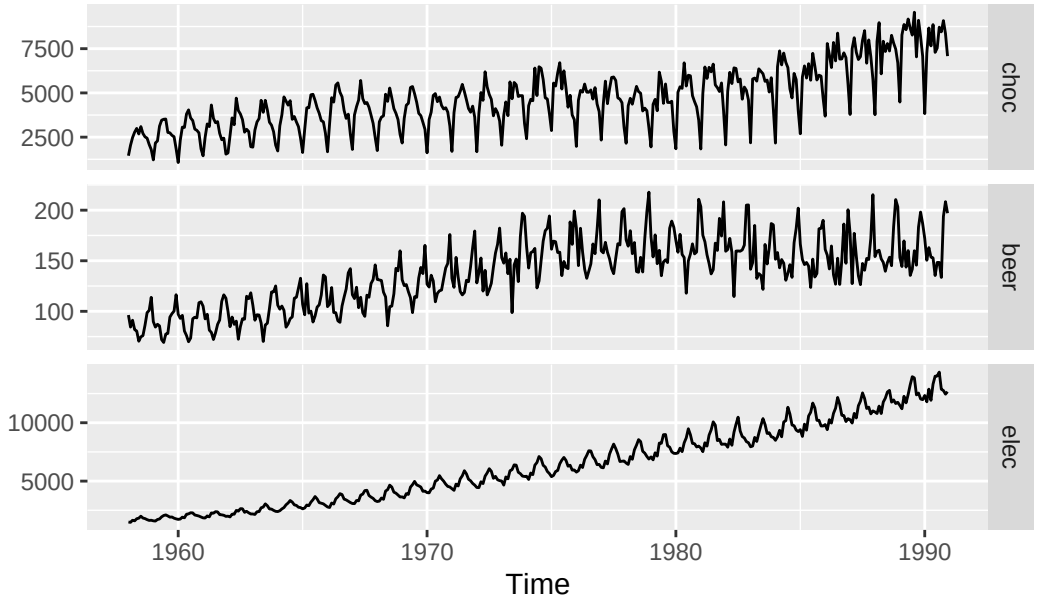


Figure 6:

Seasonal

- : `AirPassengers`

`ggseasonplot()` seasonal Figure 7 .

```
ggseasonplot(AirPassengers)
```

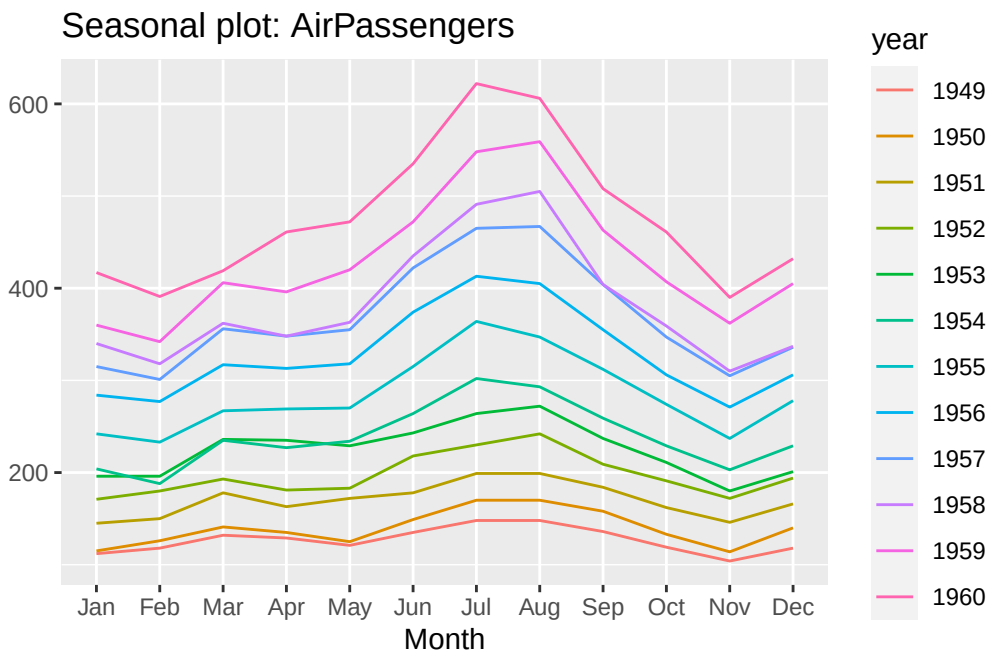


Figure 7: `ggseasonalplot()` seasonal

seasonal Figure 8 .

```
ggseasonplot(AirPassengers, year.labels = TRUE)
```

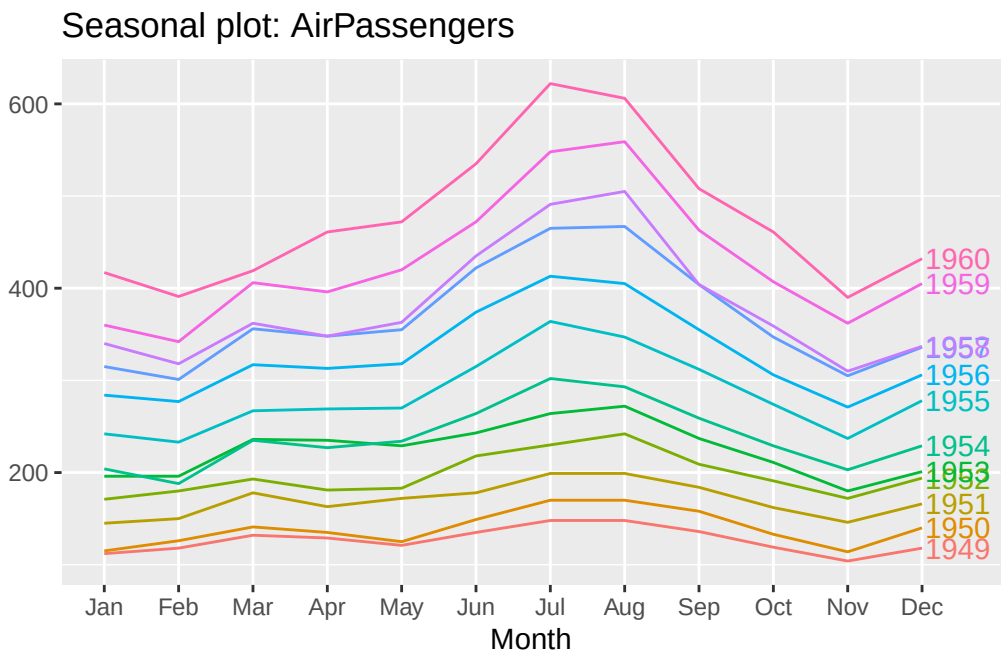


Figure 8: `ggseasonalplot()` seasonal

seasonal Figure 9 .

```
ggseasonplot(AirPassengers,
             year.labels = TRUE, year.labels.left = TRUE)
```

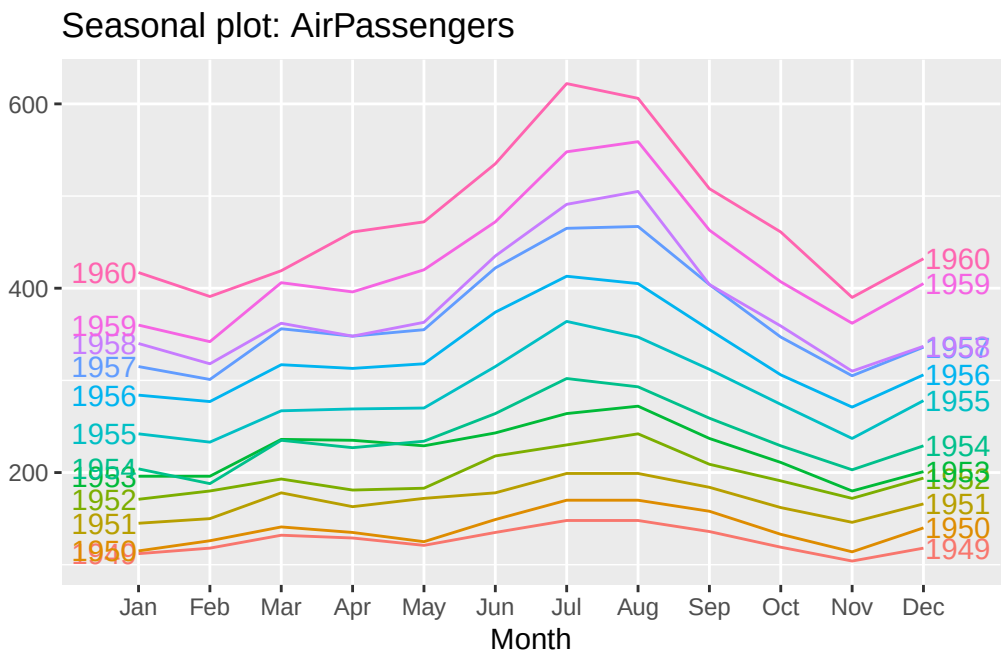


Figure 9: `ggseasonalplot()` `year.labels.left = TRUE` seasonal

seasonal Figure 10 .

```
ggseasonplot(AirPassengers, polar = TRUE)
```

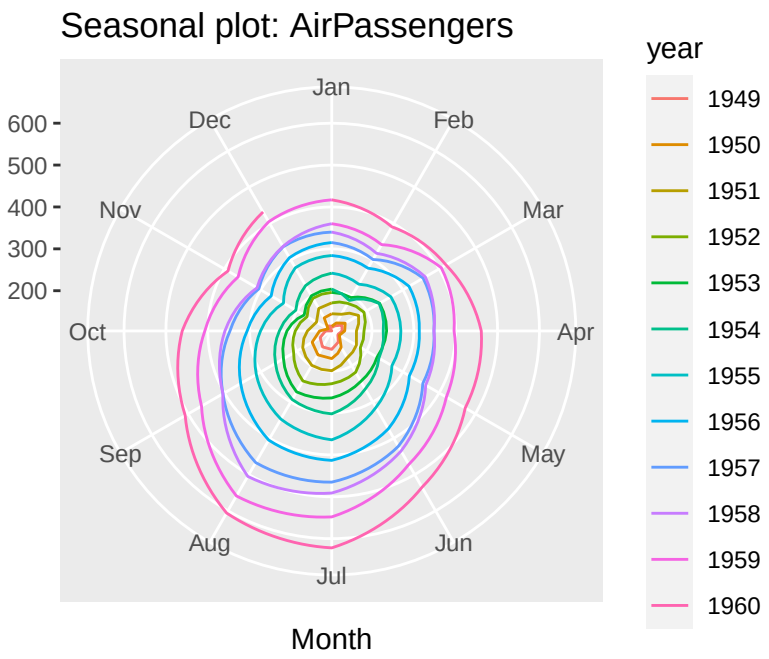


Figure 10: `ggseasonalplot()` `polar = TRUE` seasonal

`ggsubseriesplot()` Figure 11 . , .

```
ggsubseriesplot(AirPassengers)
```

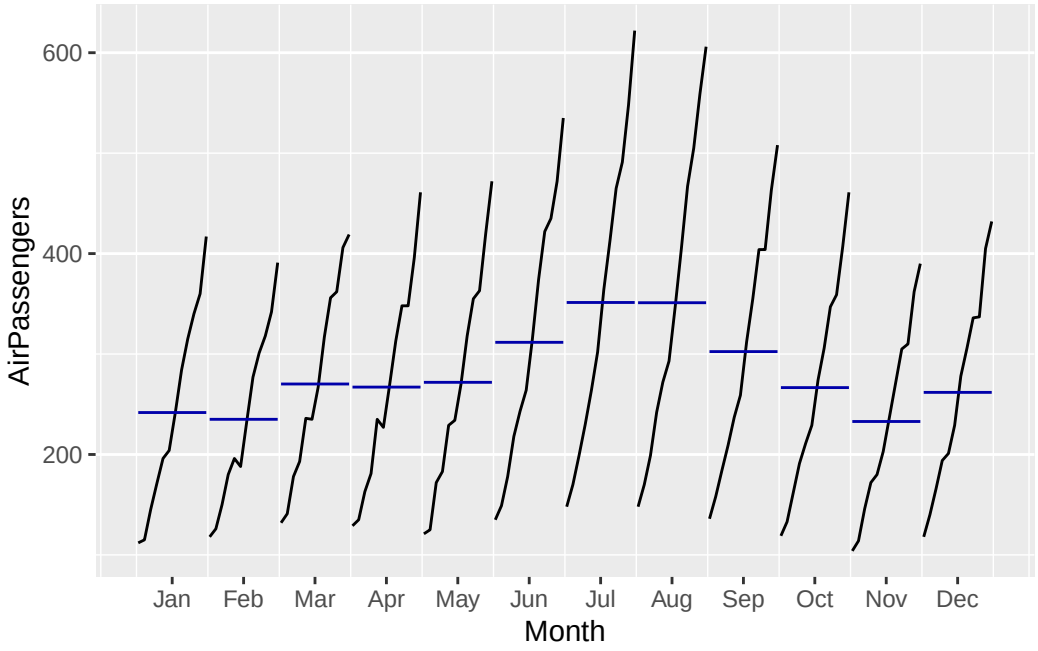


Figure 11: `ggsubseriesplot()` seasonal

. `ts` `AirPassengers` , `cycle()` . Figure 12 .

```
tibble(AP = as.numeric(AirPassengers),
       mon = as.factor(cycle(AirPassengers))) %>%
  ggplot(aes(x = mon, y = AP)) +
  geom_boxplot() +
  labs(x = "Month", y = "Air Passengers")
```

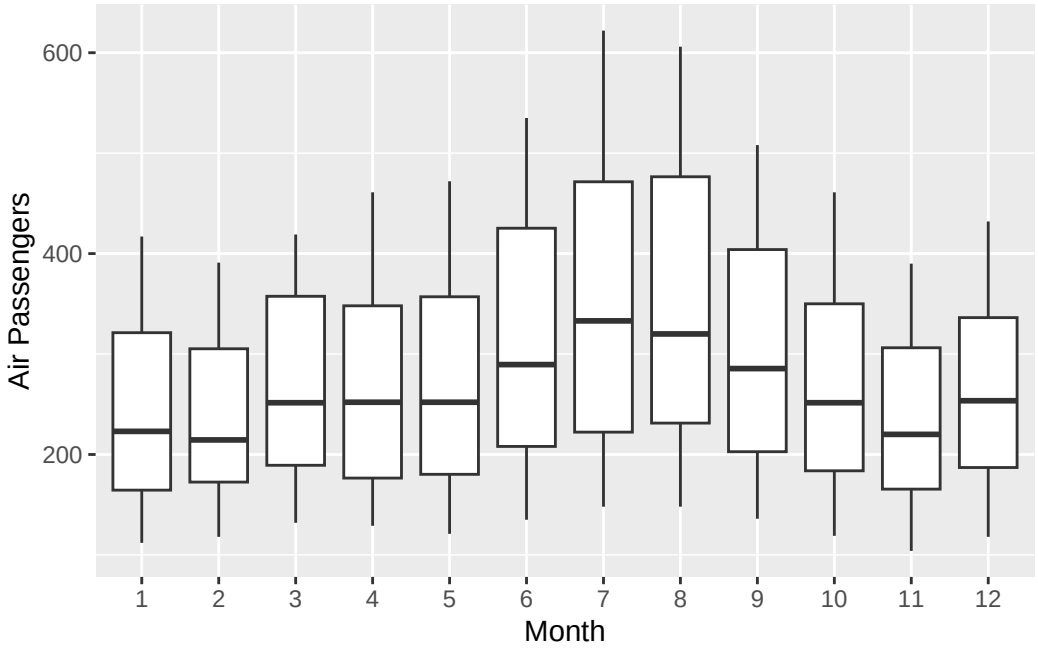
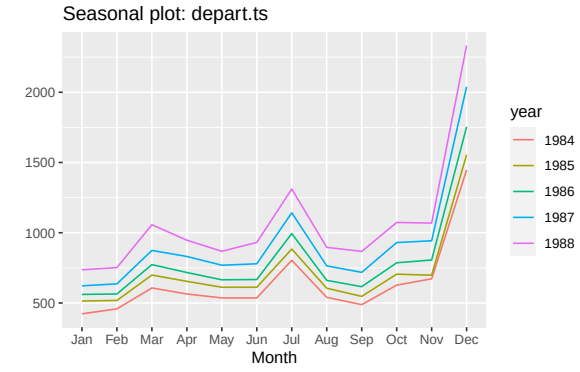


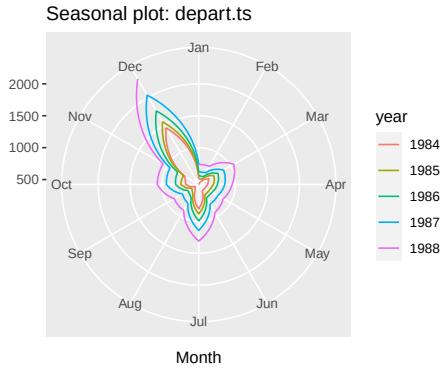
Figure 12:

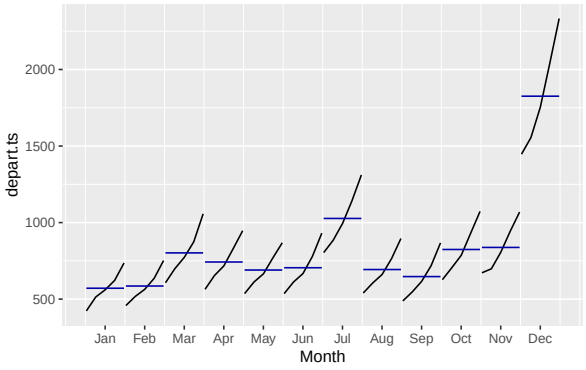
1. `depart.txt` seasonal , .

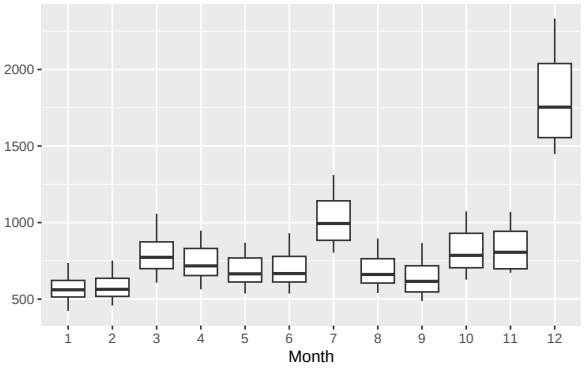
2. 1981 1 1992 12 `Ktour.txt` . `https://raw.githubusercontent.com/y`
.

- ts
-
- seasonal


Seasonal plot: depart.ts
2000
1500
1000
500
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Month
year
1984
1985
1986
1987
1988


Seasonal plot: depart.ts
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2000
1500
1000
500
Month
year
1984
1985
1986
1987
1988


depart.ts
2000
1500
1000
500
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Month


2000
1500
1000
500
1 2 3 4 5 6 7 8 9 10 11 12
Month