

# Forecasting issues

*Forecast Padawan 2*

*November 17, 2016*

The goal of this experiment is to design the best model to forecaste the number of issue in the per day in the comming two weeks. We think that this could help Open Source organisation to manage there human ressources.

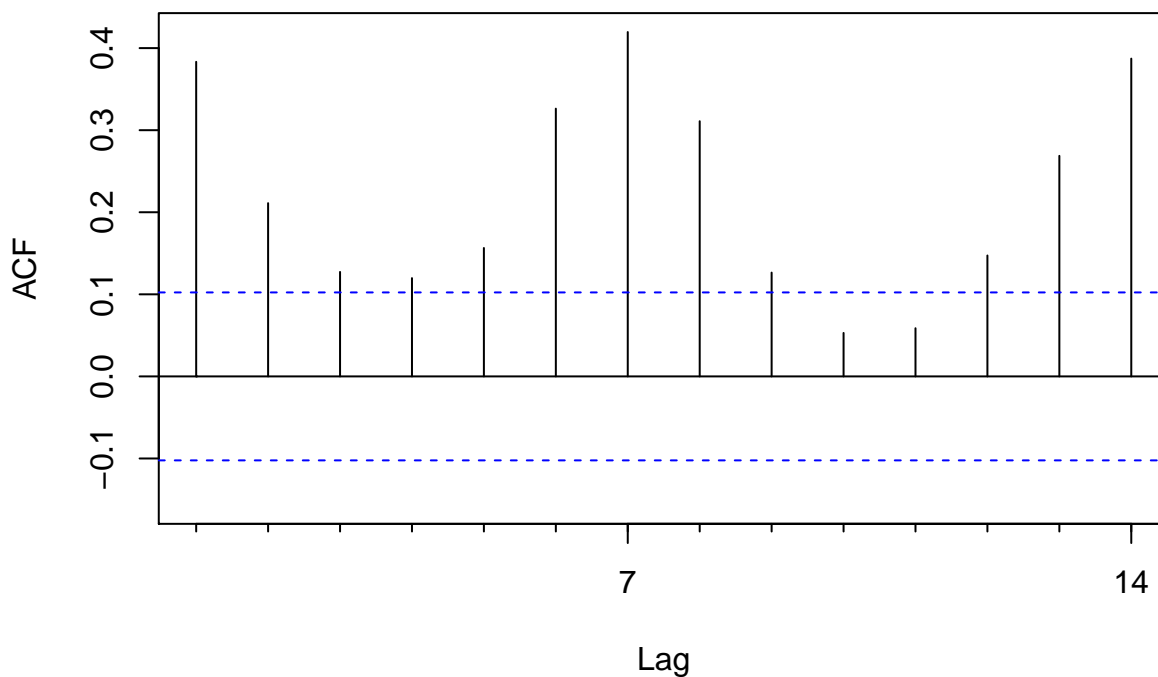
## Load the data

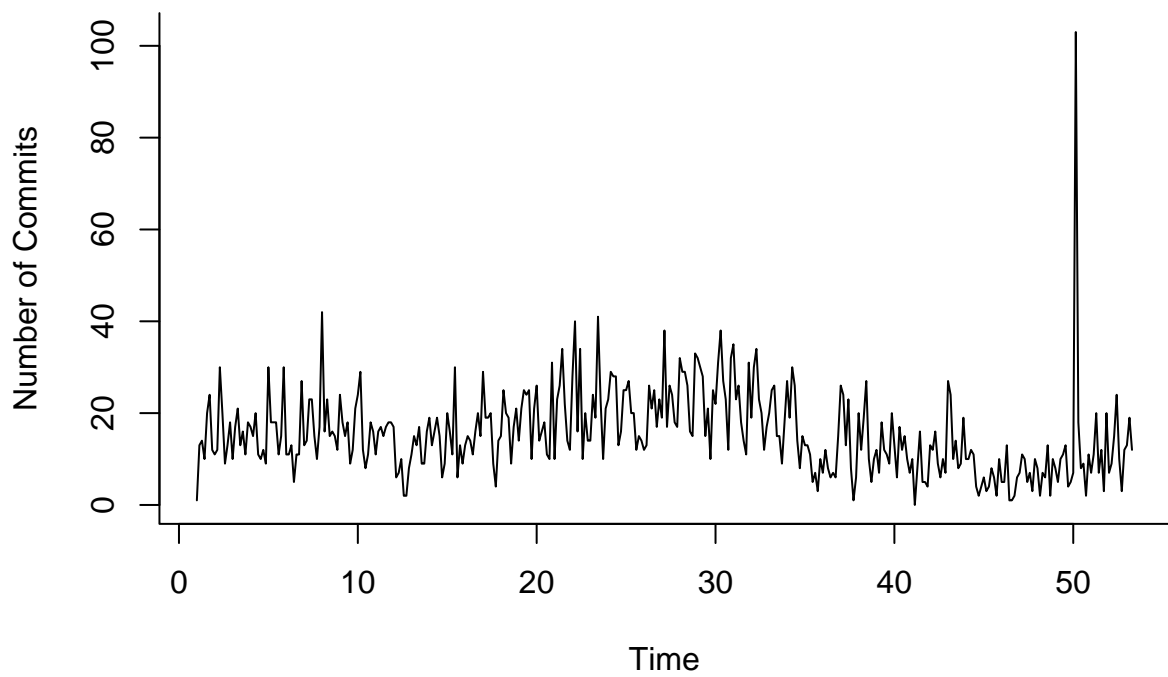
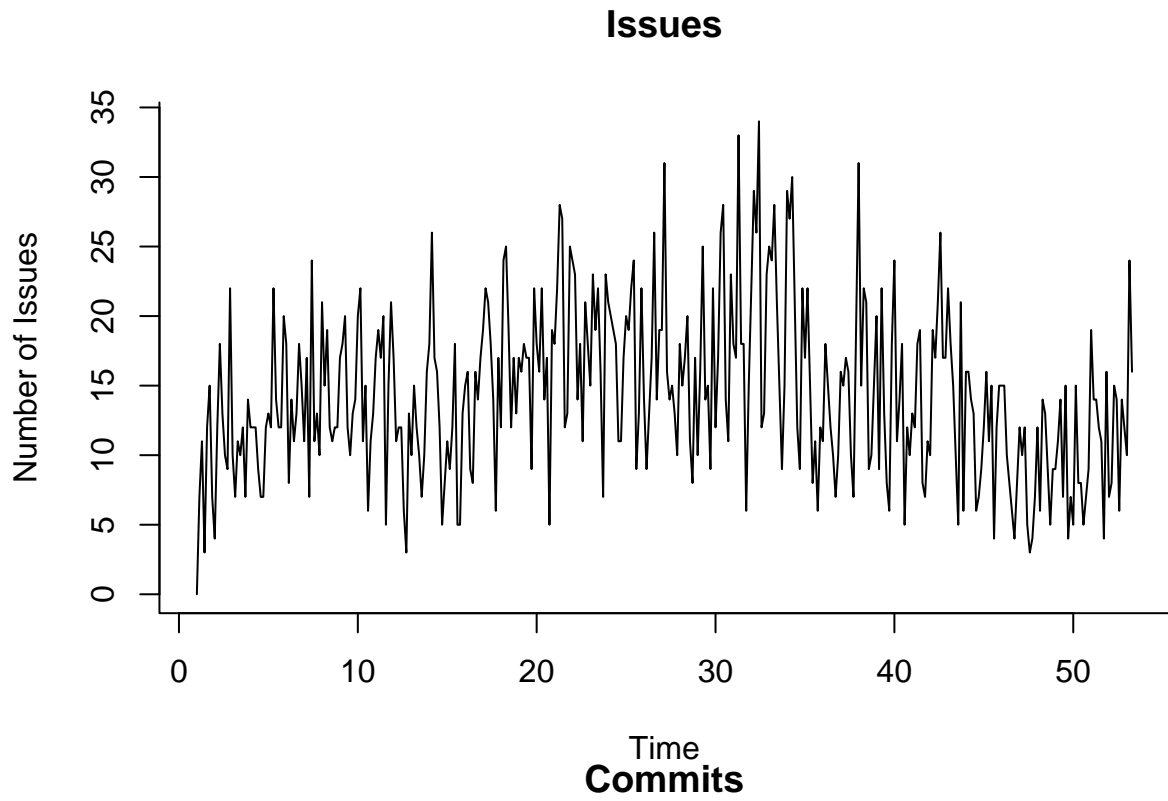
```
#install.packages('forecast')

library('forecast')
library(knitr)
#load the data frame
repository.csv <- read.csv("time_series/julialang_julia_daily.csv")

repository.csv$date = as.POSIXlt(as.Date(repository.csv$date,format='%Y-%m-%d'))
```

## keep the last 12 months



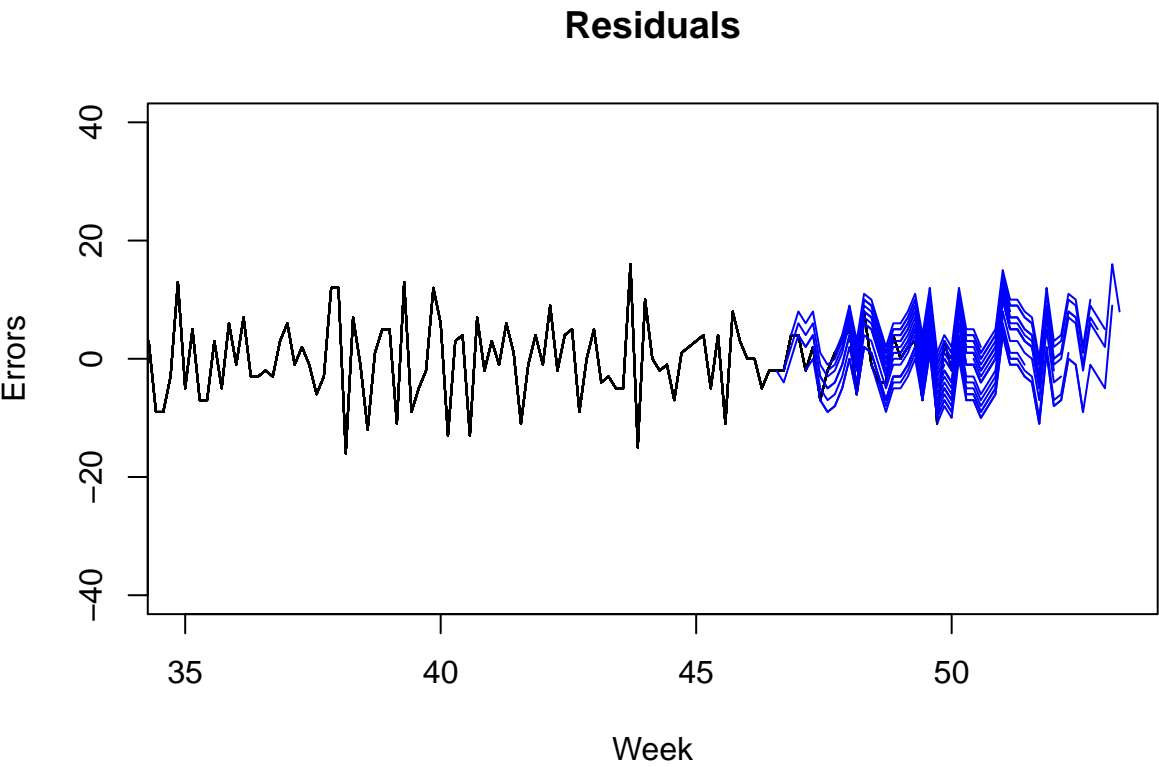


Naive Forecast

Naive

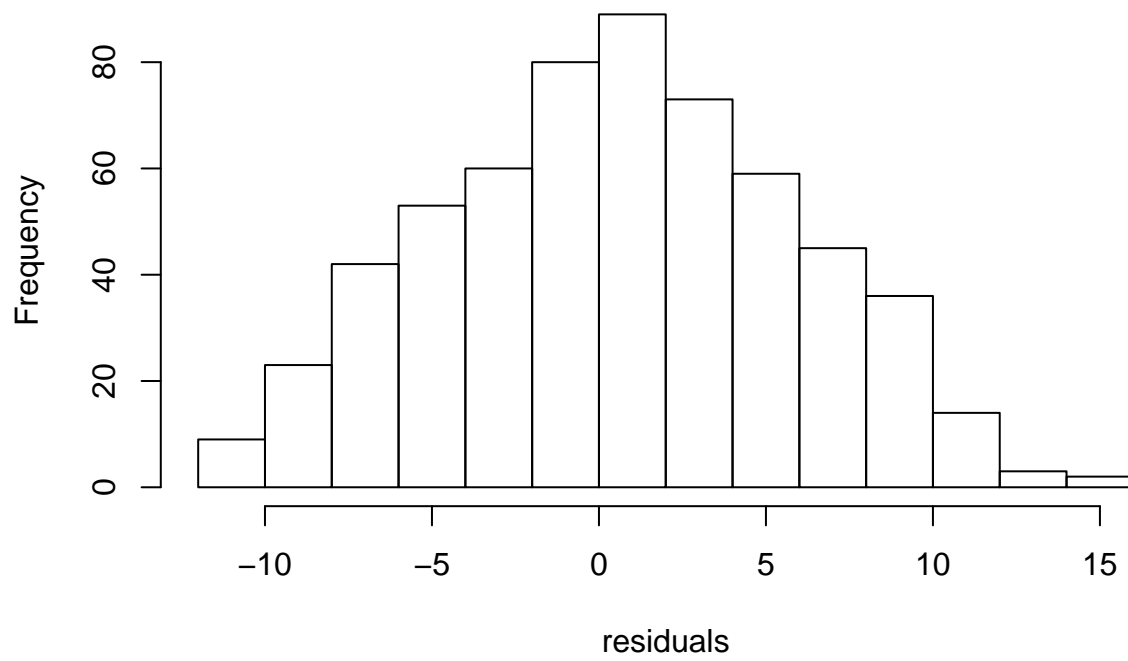
	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	0.0260345	6.693201	5.292482	-13.742514	43.88979	1.0482411	-0.3437756	NA
Test set	1.0578231	5.351101	4.442177	-8.511755	52.79771	0.8805386	-0.0010628	0.9754286
[(forecast_is_sues_files/figure-latex/unnamed-chunk-6-1.pdf) < !- -->								

## NULL

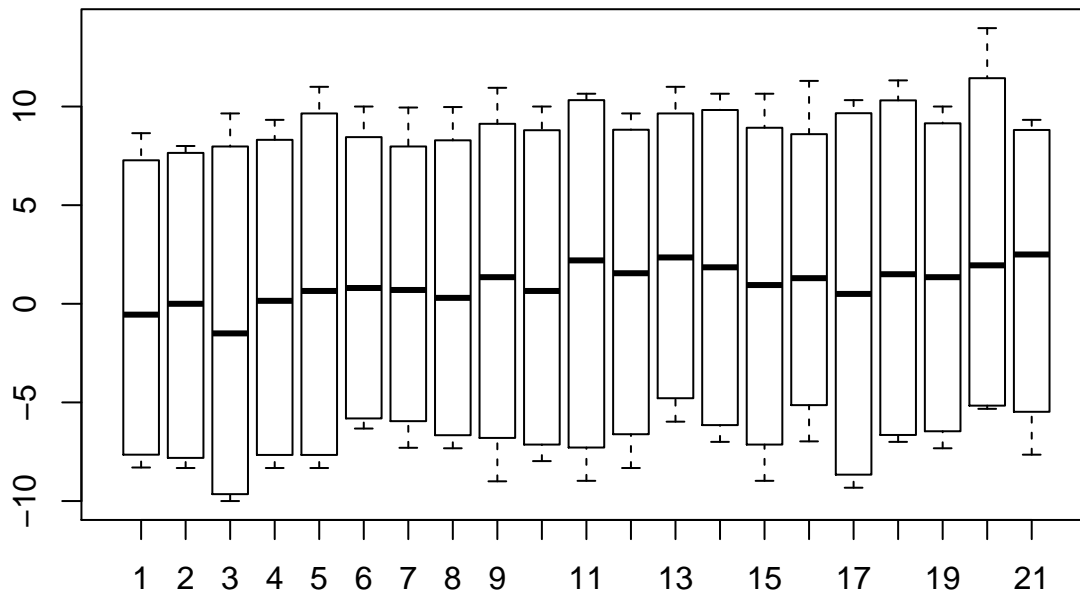


## NULL

**Histogram of residuals**



```
## 97.5% 95% 5% 2.5%
## 11 10 -8 -9
```



```
## 97.5% 95% 5% 2.5%
## 11 10 -8 -9
```

Seasonal Naive

```
snaive.forecast <- function(sample) {
  results <- list()
  results$train <- sample$train.ts
  results$valid <- sample$valid.ts
  results$pred <- snaive(sample$train.ts, h=n.valid)
  results$fitted <- results$pred$fitted
  results$residual <- sample$valid.ts - results$pred$mean
  results$summary <- accuracy(results$pred, sample$valid.ts)

  return(results)
}

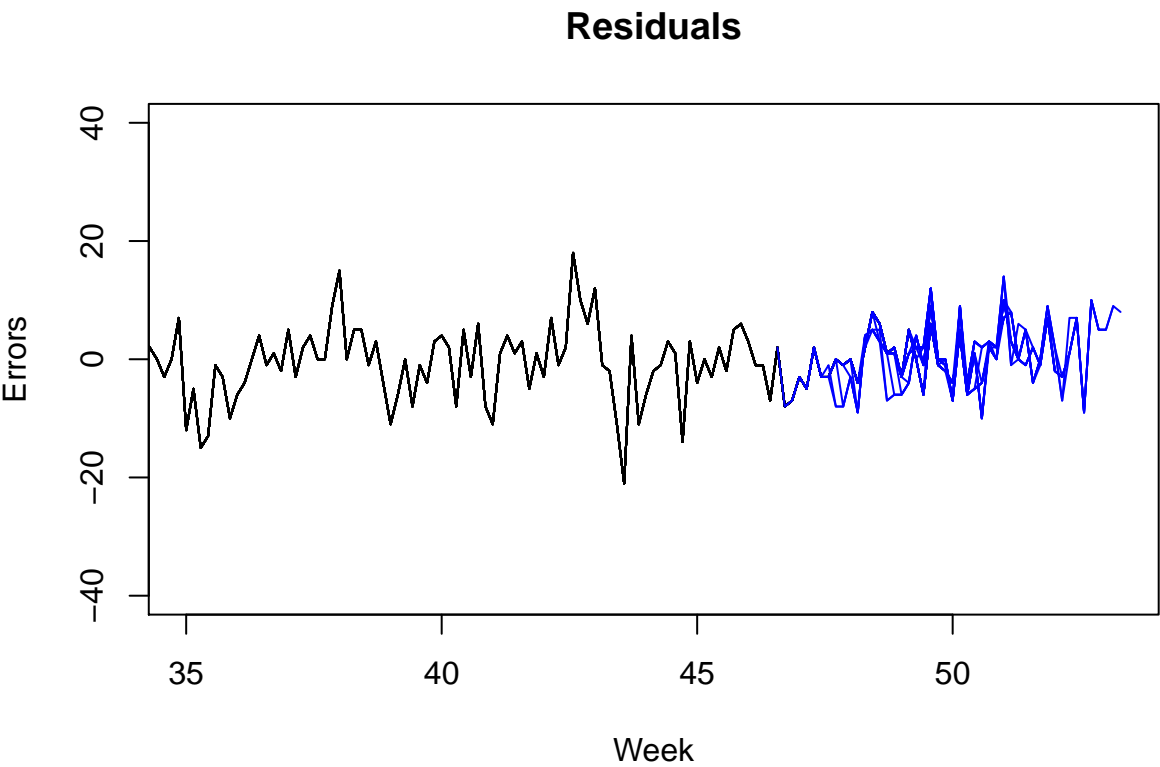
all.snaive.forecast <- sapply(1:n.sample, function(i) return(snaive.forecast(all.issues[,i])))

kable(mean.all.accuracy(all.snaive.forecast))
```

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	0.0258080	6.436605	5.049082	-11.319282	39.94165	1.0000000	0.1250244	NA
Test set	0.6445578	4.846830	3.869048	-7.453078	43.62280	0.7670362	-0.0941361	0.8859009

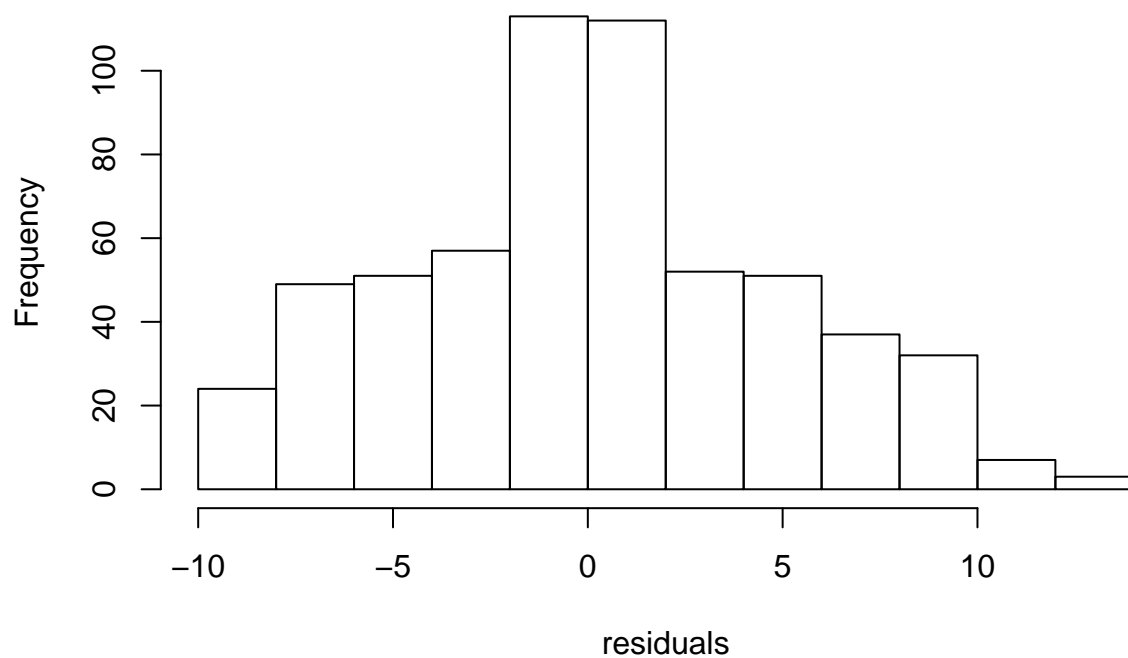
(forecast\_is sues\_files/f igure-latex /unnamed-ch unk-11-1.pdf)

## NULL

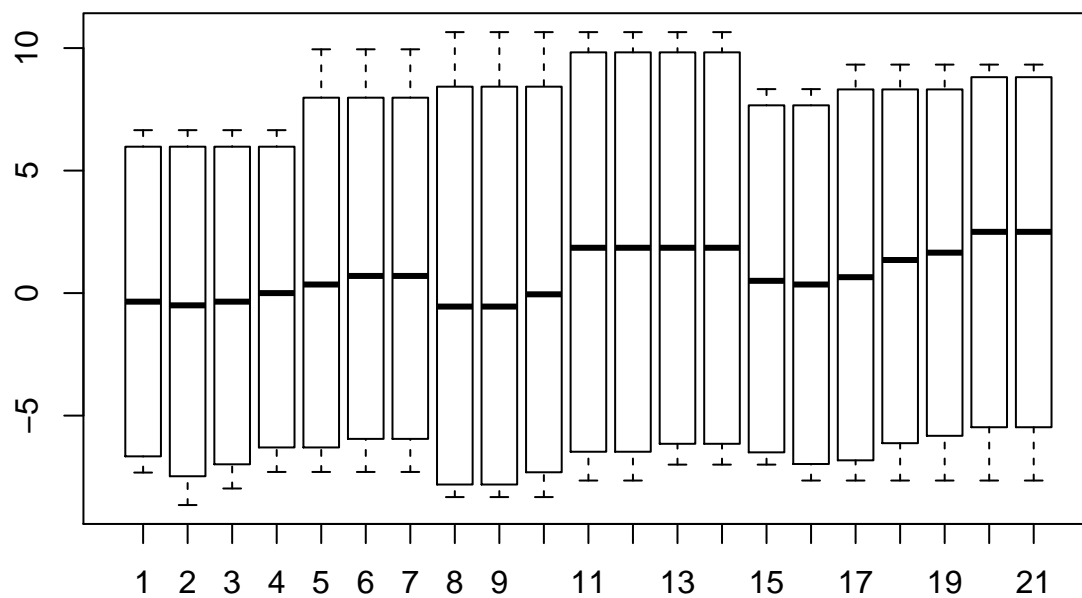


## NULL

# Histogram of residuals



```
## 97.5% 95% 5% 2.5%
## 10 9 -7 -9
```



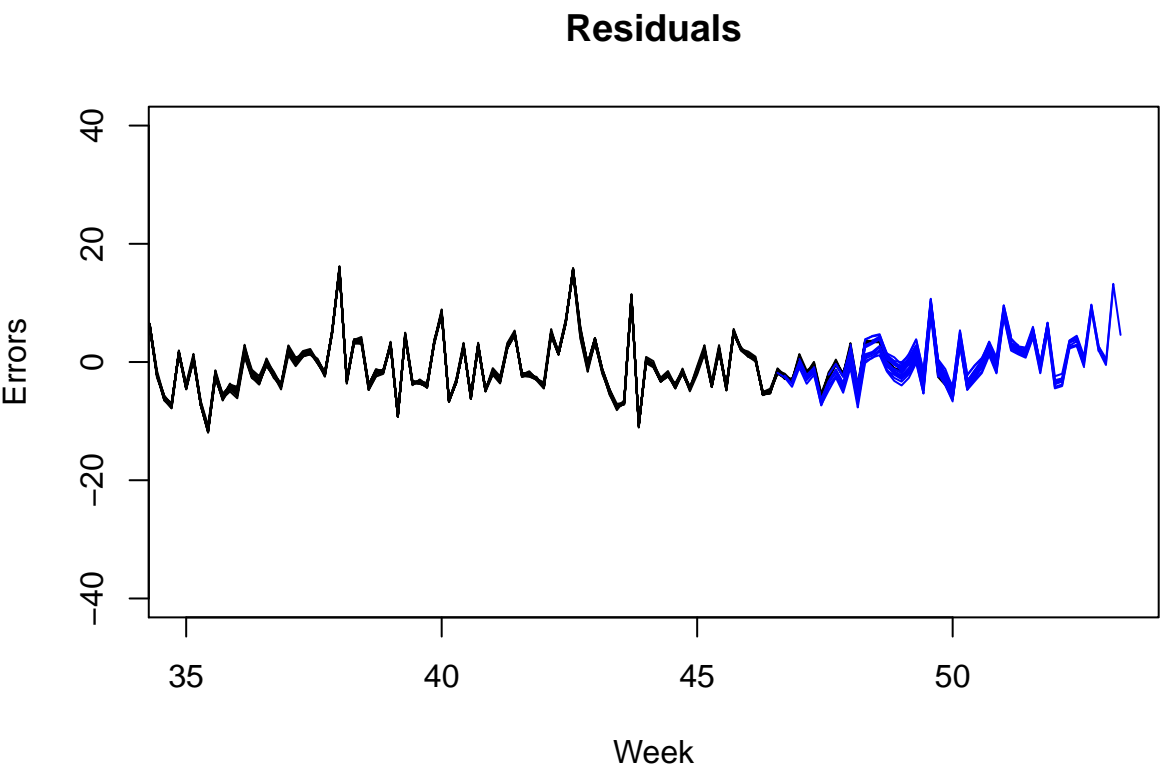
```
## 97.5% 95% 5% 2.5%
## 10 9 -7 -9
```

Smoothing

Exponential smoothing ZAA

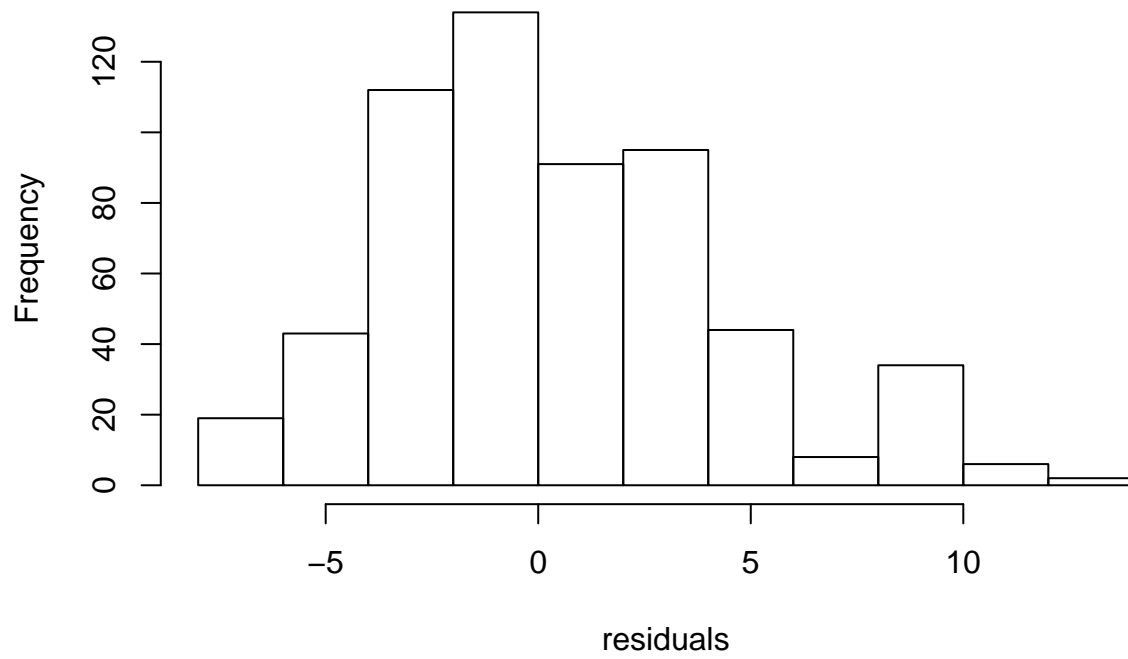
	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	0.0162352	4.794487	3.808861	-Inf	Inf	0.7543855	0.0652222	NA
Test set	0.3894835	3.920933	3.091101	-8.900475	34.96387	0.6126821	-0.1436503	0.7219754
[(forecast_is_sues_files/figure-latex/unnamed-chunk-16-1.pdf)]								

## NULL

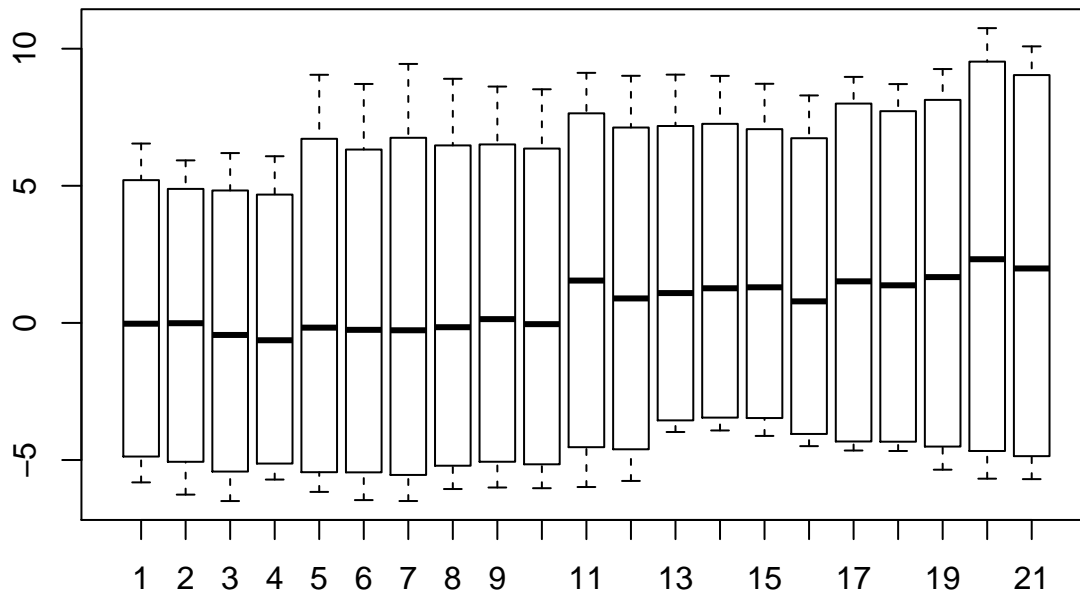


## NULL

# Histogram of residuals



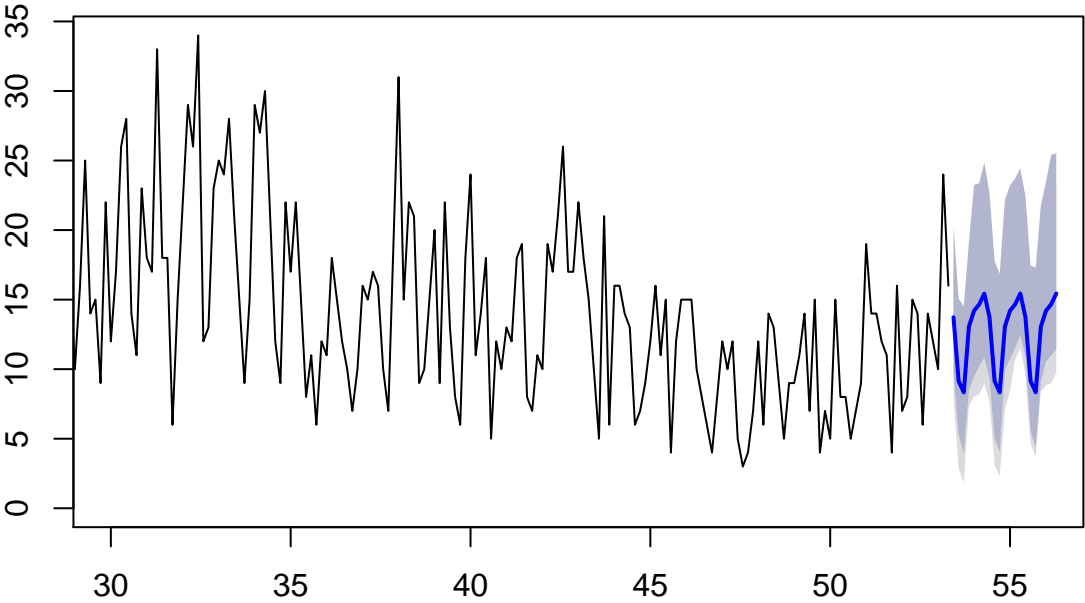
```
##      97.5%      95%      5%      2.5%
##  9.538827  8.534905 -5.217258 -6.223327
```



```
##      97.5%      95%      5%      2.5%
##  9.538827  8.534905 -5.217258 -6.223327
```



Forecasts from

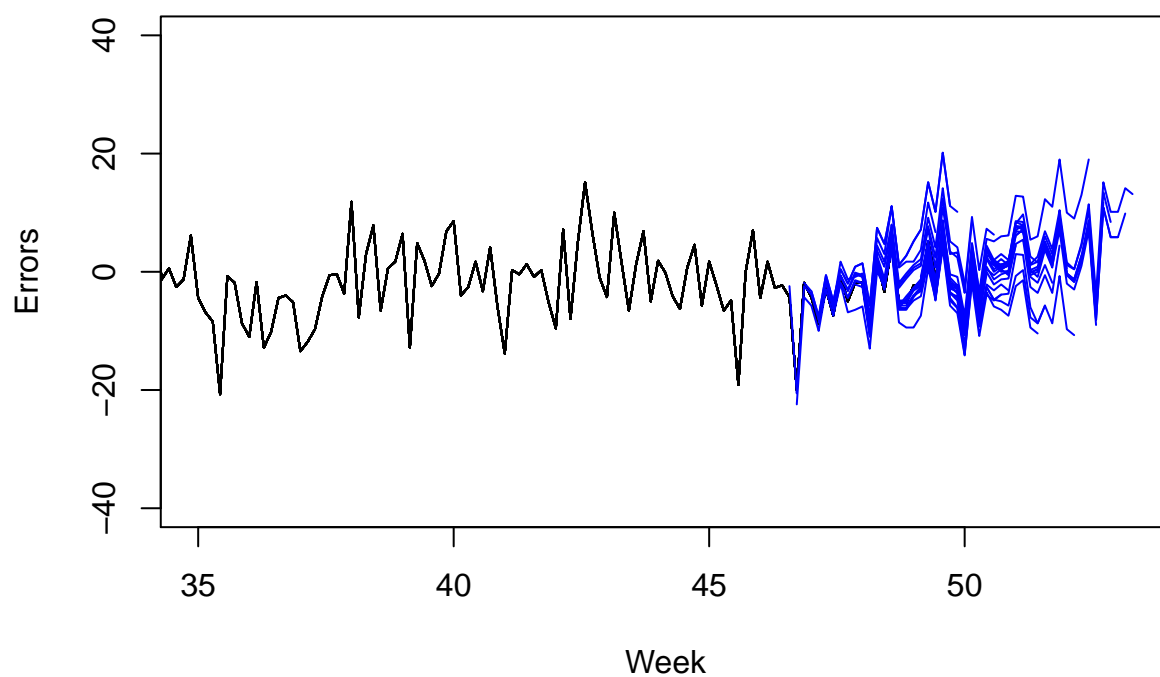


Double differencing

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	-0.0691779	6.246668	4.862882	-12.26012	37.71729	0.9564487	0.1526361	NA
Test set	0.2201166	5.804296	4.688047	-12.86606	57.22284	0.9219840	-0.0075625	1.010501
[(forecast_is_sues_files/figure-latex/unnamed-chunk-22-1.pdf)]								

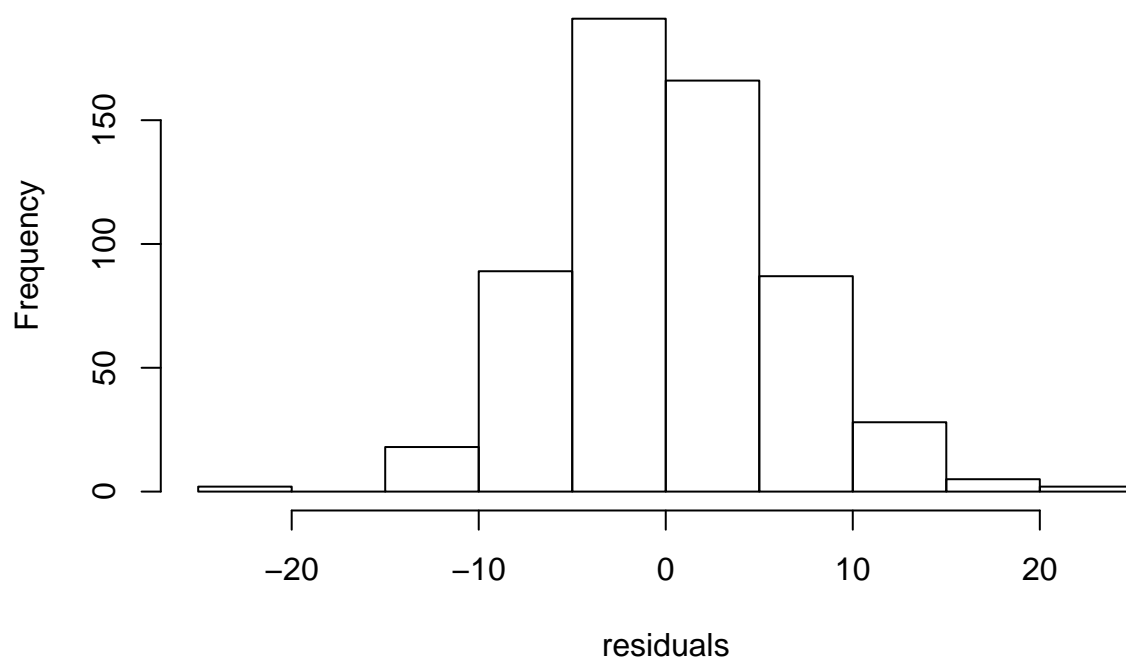
## NULL

## Residuals

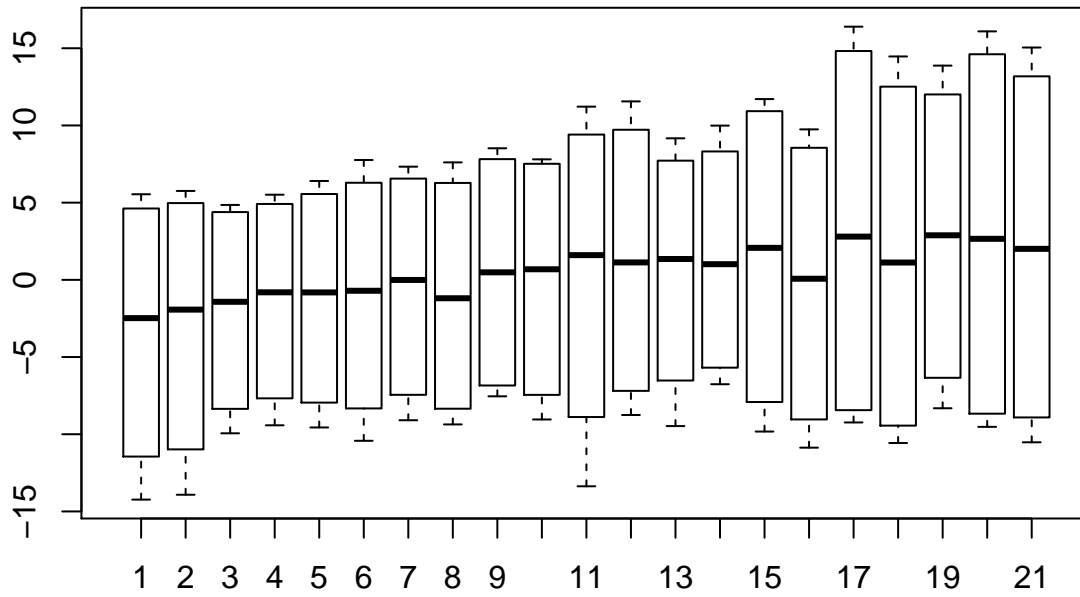


## NULL

## Histogram of residuals



##	97.5%	95%	5%	2.5%
##	12.332143	10.328571	-9.285714	-10.428571



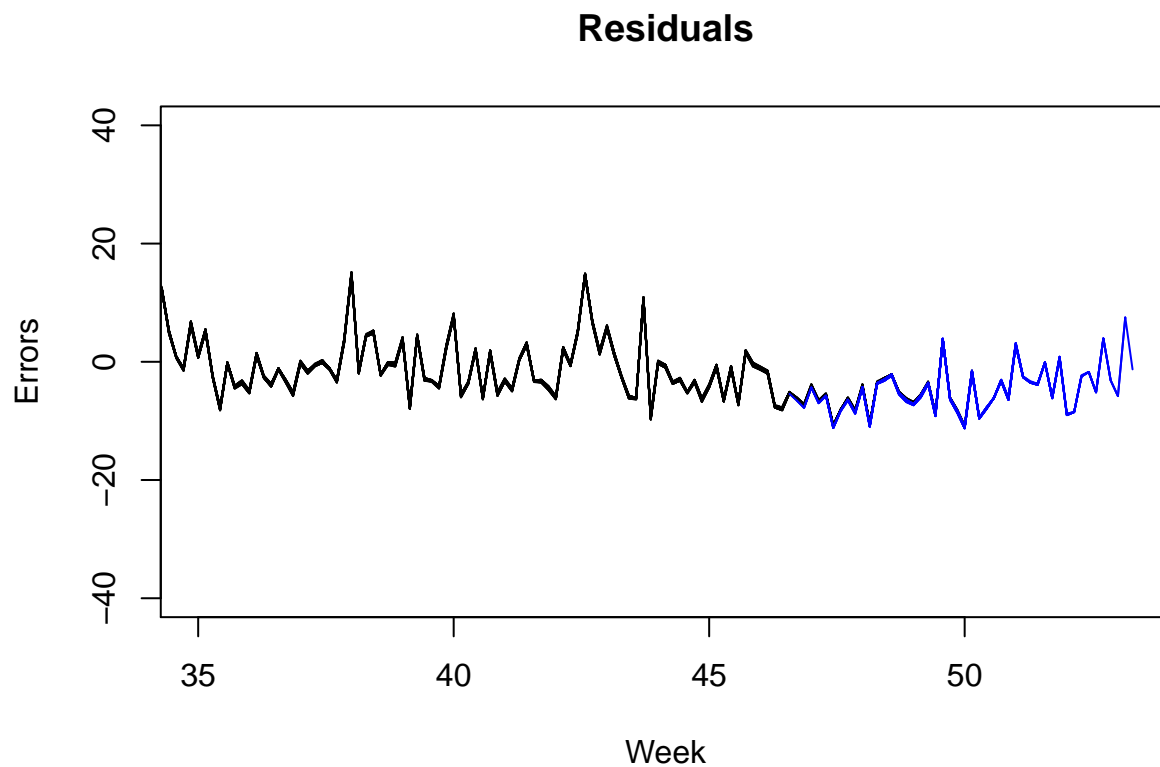
```
##          97.5%          95%          5%          2.5%
## 12.332143 10.328571 -9.285714 -10.428571
```

## Regression

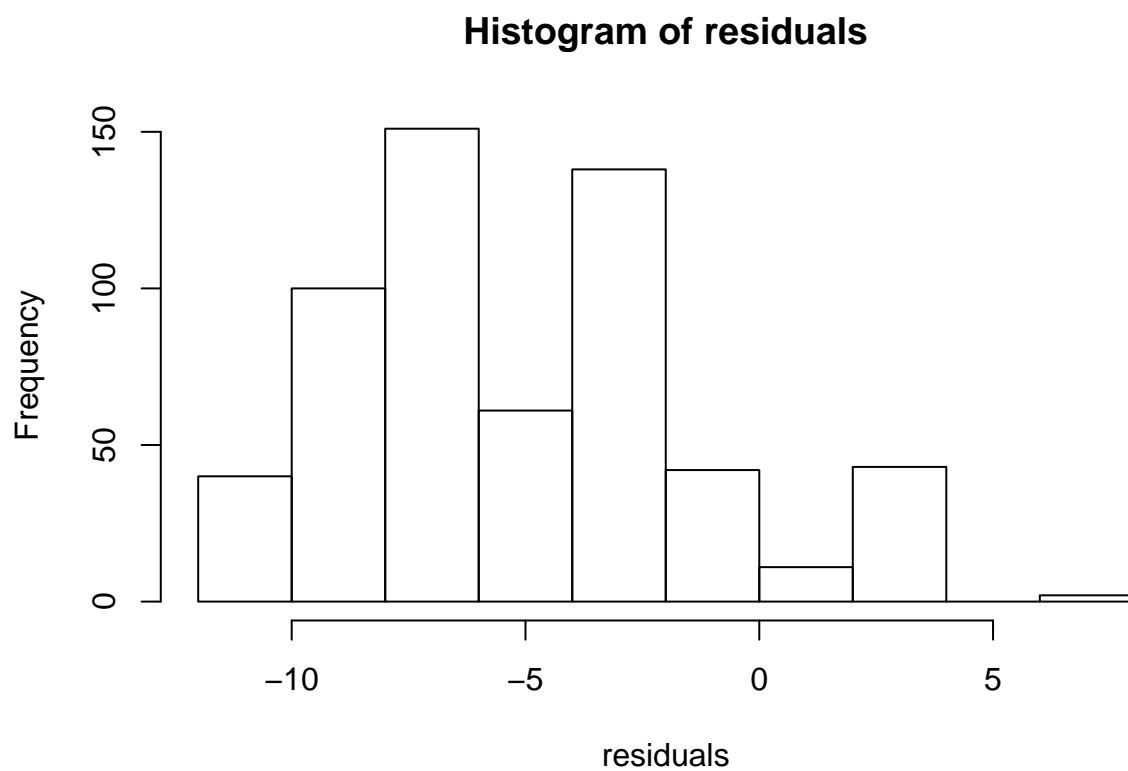
### Linear additive regression season

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	0.000000	5.400961	4.274193	-Inf	Inf	0.8466724	0.3527956	NA
Test set	-5.050462	6.286722	5.641483	-77.00581	80.59837	1.1162375	-0.1390164	1.167219
[(forecast_is_sues_files/figure-latex/unnamed-chunk27-1.pdf)]								

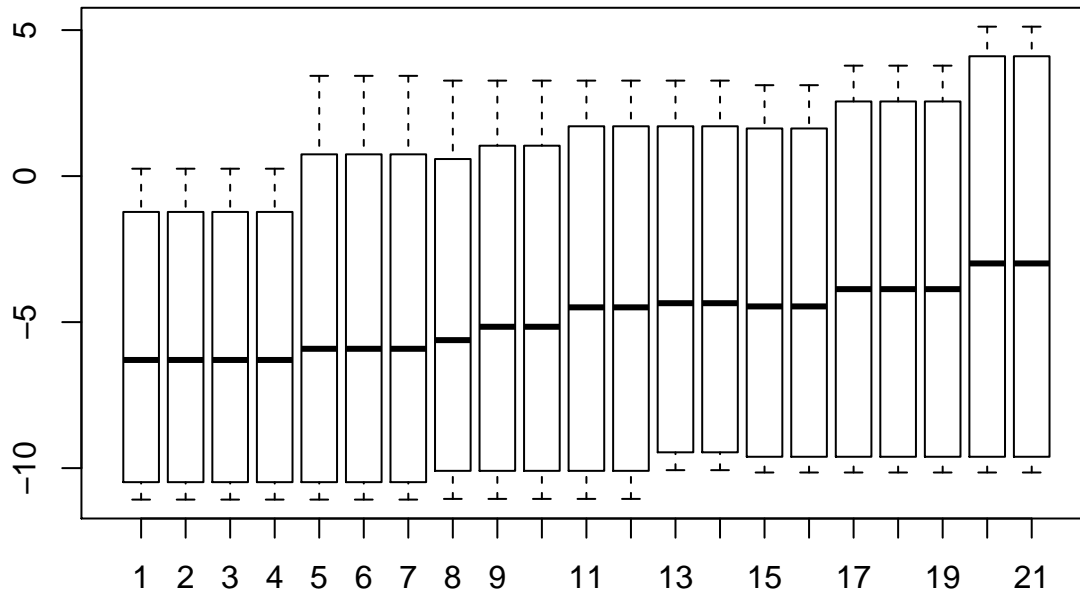
```
## NULL
```



## NULL



##	97.5%	95%	5%	2.5%
##	3.87234	3.20000	-11.00000	-11.16667



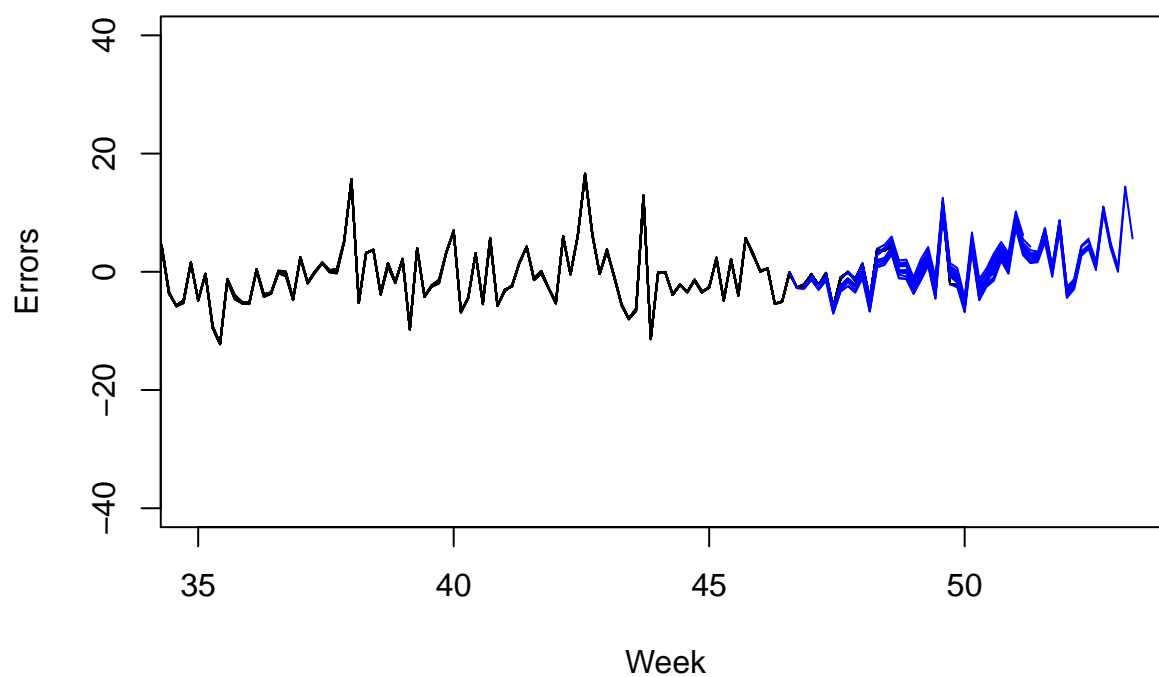
```
##      97.5%      95%      5%      2.5%
##  3.87234  3.20000 -11.00000 -11.16667
```

**Arima (order=c(1,1,1), seasonal=c(1,1,1))**

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	-0.4302686	4.853986	3.765734	-15.297233	31.46267	0.7458404	-0.0144115	NA
Test set	1.2040254	4.247021	3.290344	1.050514	35.26485	0.6525639	-0.1116419	0.7717494
□(forecast_is	sues_files/fi	gure-latex/	unnamed-chu	nk-32-1.pdf)<	!- ->			

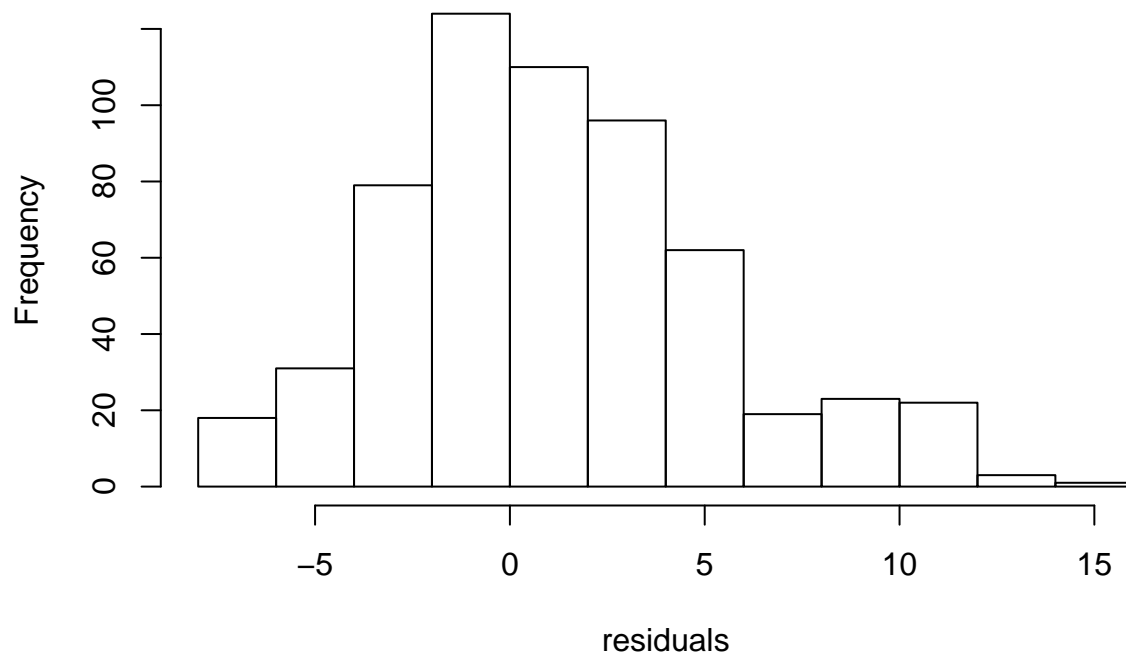
```
## NULL
```

## Residuals

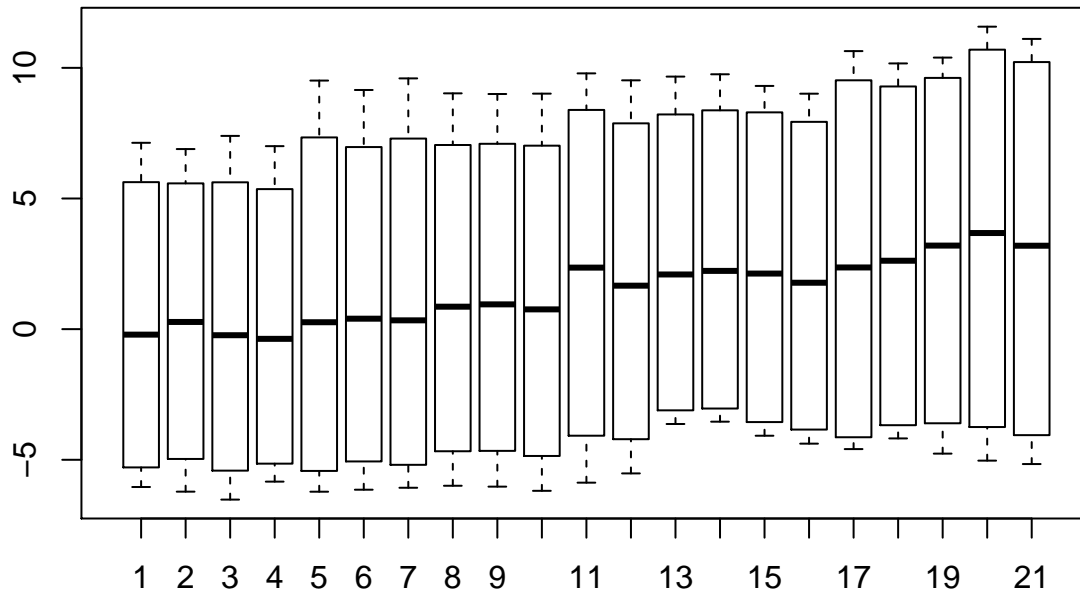


## NULL

## Histogram of residuals



##	97.5%	95%	5%	2.5%
##	10.483473	9.404964	-5.003919	-6.098532

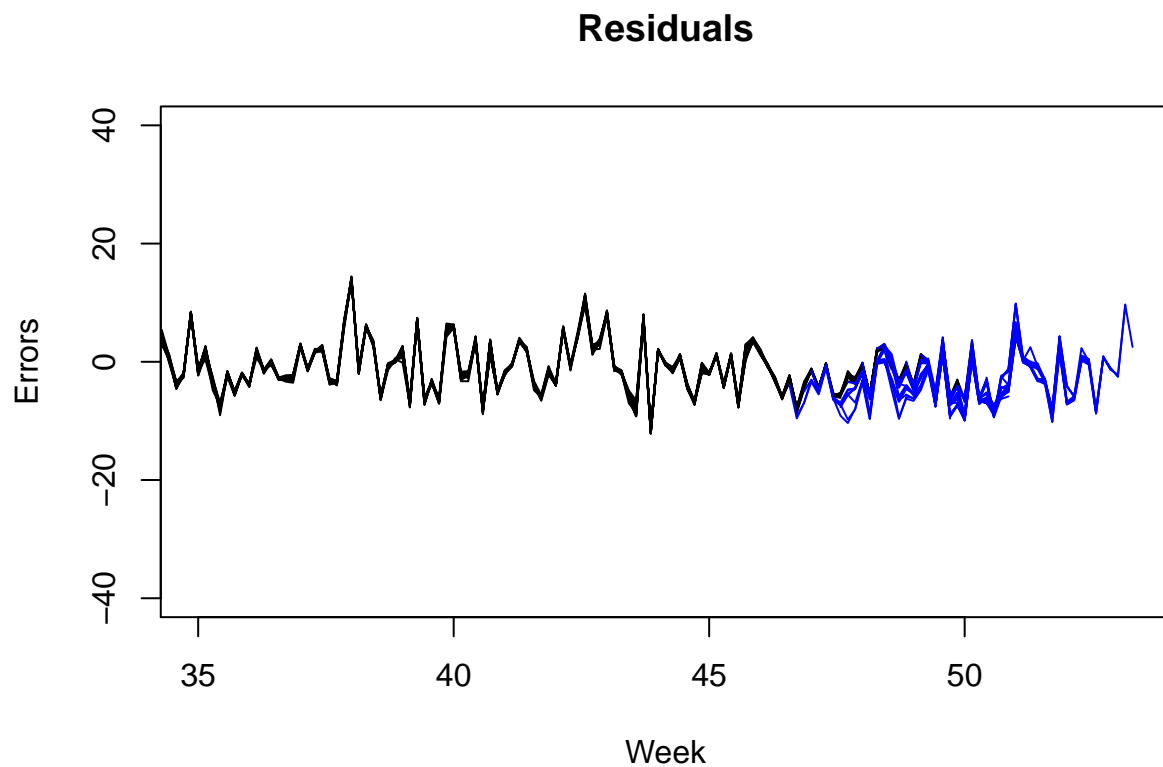


```
##      97.5%      95%      5%      2.5%
## 10.483473  9.404964 -5.003919 -6.098532
```

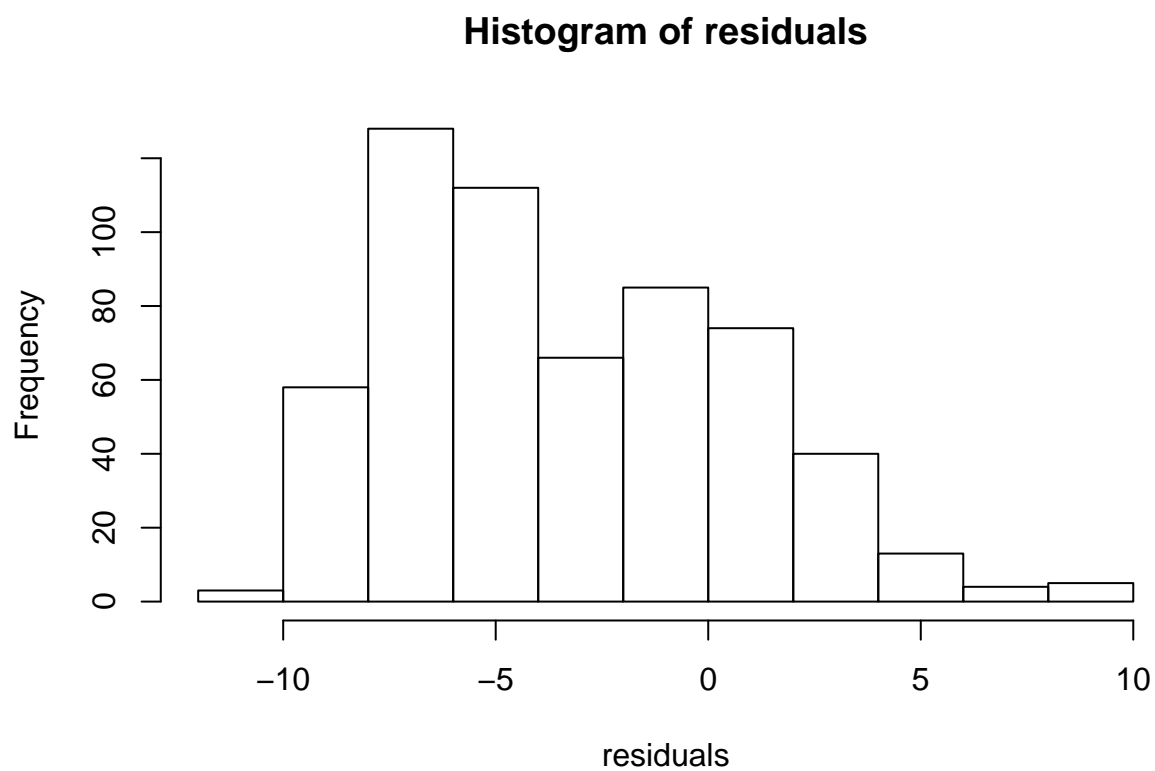
Neural Network (repeats = 20, p=1, P=1, size=7)

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	0.0051319	4.817521	3.869326	-14.78911	33.35744	0.7663914	-0.0416209	NA
Test set	-3.3259210	5.186514	4.331163	-60.67342	66.81815	0.8574047	-0.0903059	0.9670458
<div> <div>(forecast_is</div> <div>sues_files/fi</div> <div>gure-latex/</div> <div>unnamed-chu</div> <div>nk-37-1.pdf)</div> </div>								

```
## NULL
```

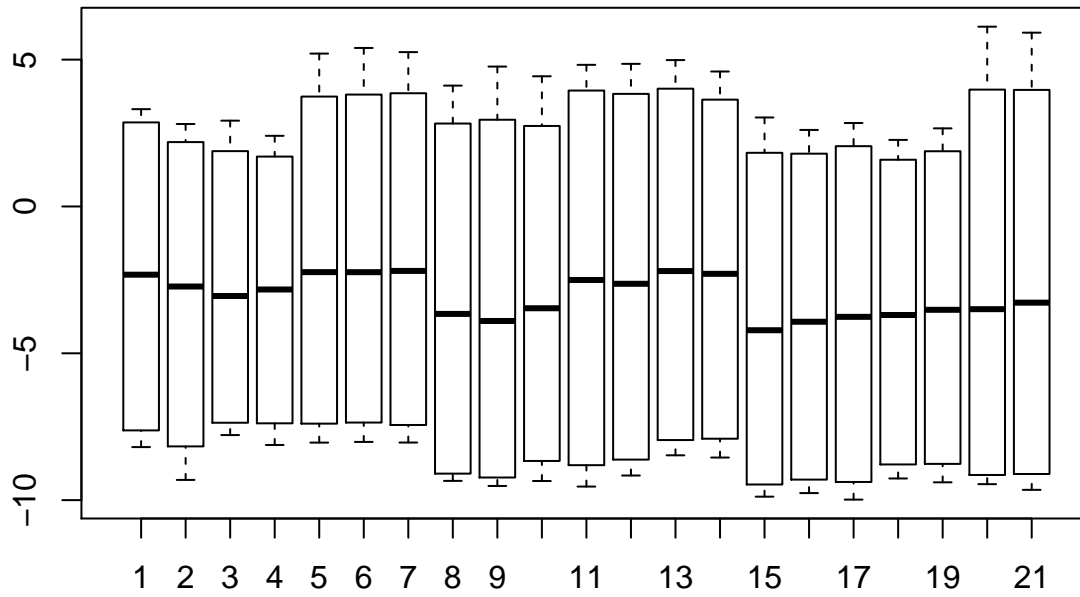


## NULL



##	97.5%	95%	5%	2.5%
##	4.375544	3.491038	-9.163136	-9.577223



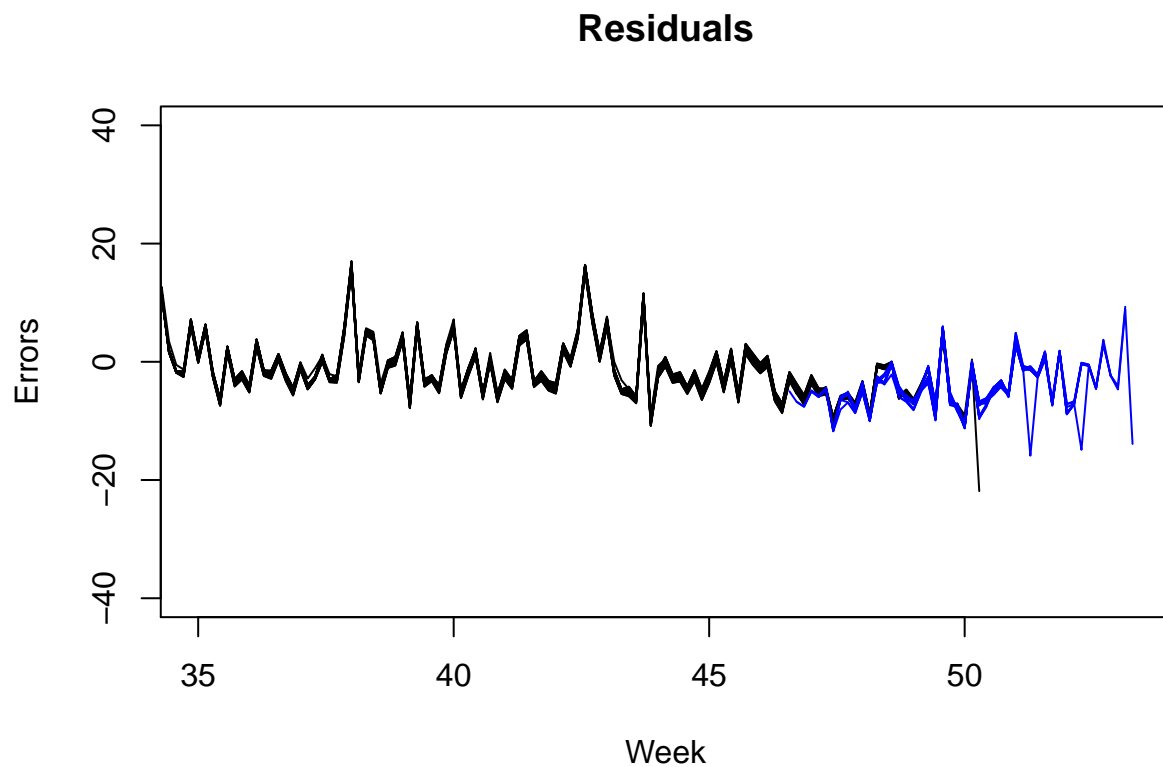


```
##      97.5%      95%      5%      2.5%
##  4.375544  3.491038 -9.163136 -9.577223
```

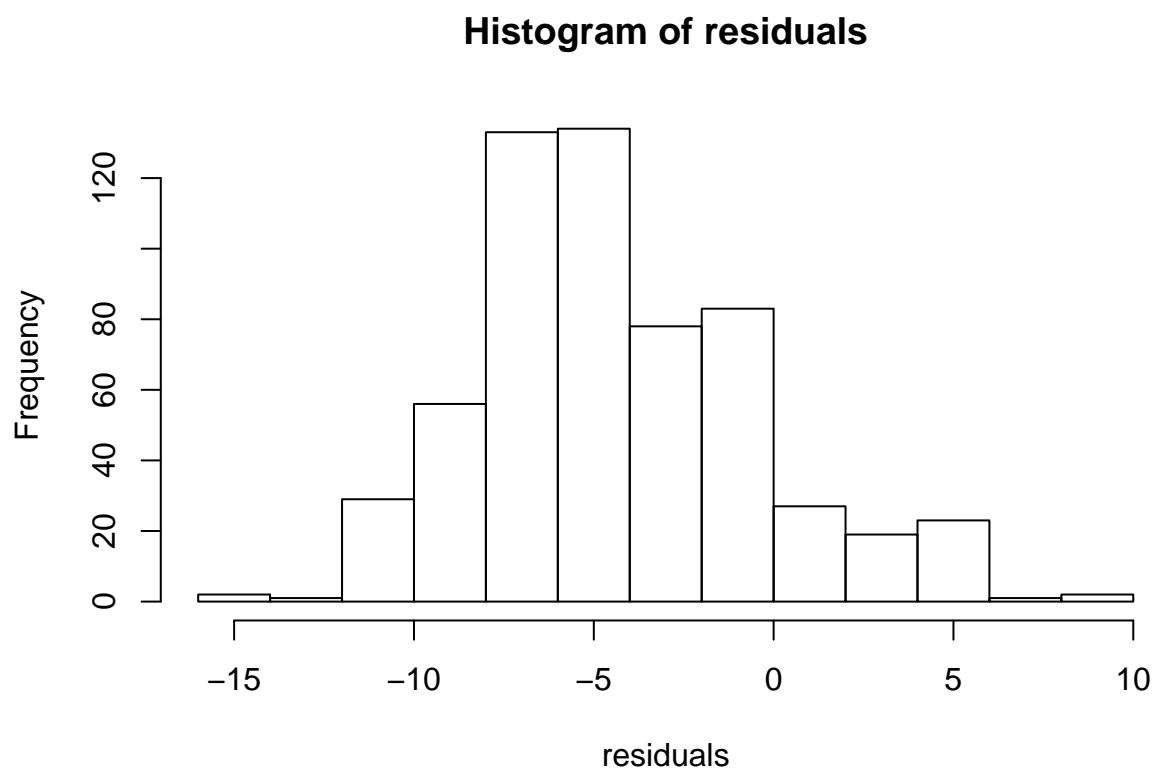
## External info Numerical using regression model

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	0.000000	5.023168	3.997864	-14.91884	34.07674	0.7913971	0.1080813	NA
Test set	-4.273161	5.866936	5.100787	-68.25978	73.47325	1.0084897	-0.1745868	1.092292
<pre>(forecast_is      sues_files/f      igure-latex      /unnamed-ch      unk-42-1.pdf      )</pre>								

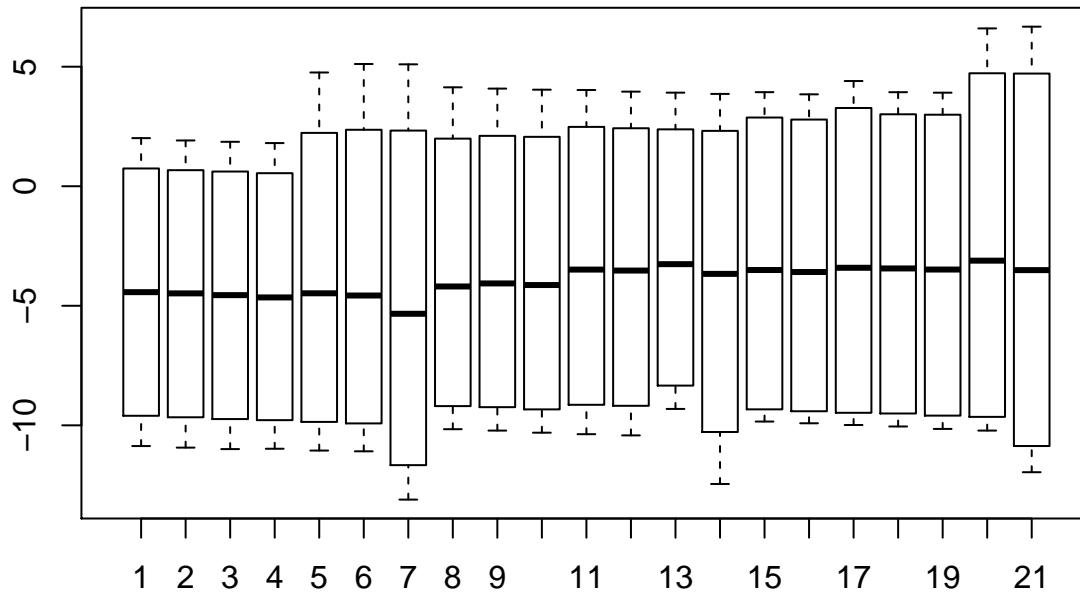
```
## NULL
```



## NULL



##	97.5%	95%	5%	2.5%
##	5.599048	3.258516	-10.536647	-11.106891

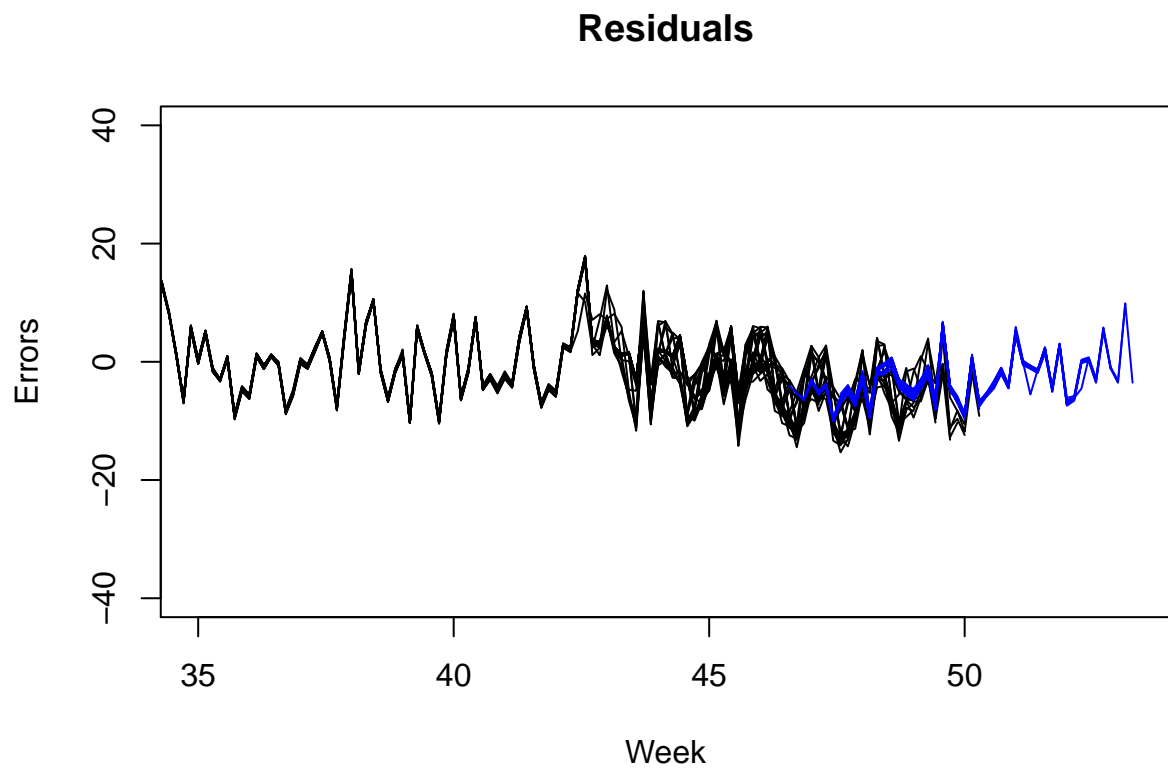


```
##          97.5%          95%          5%          2.5%
##  5.599048   3.258516 -10.536647 -11.106891
```

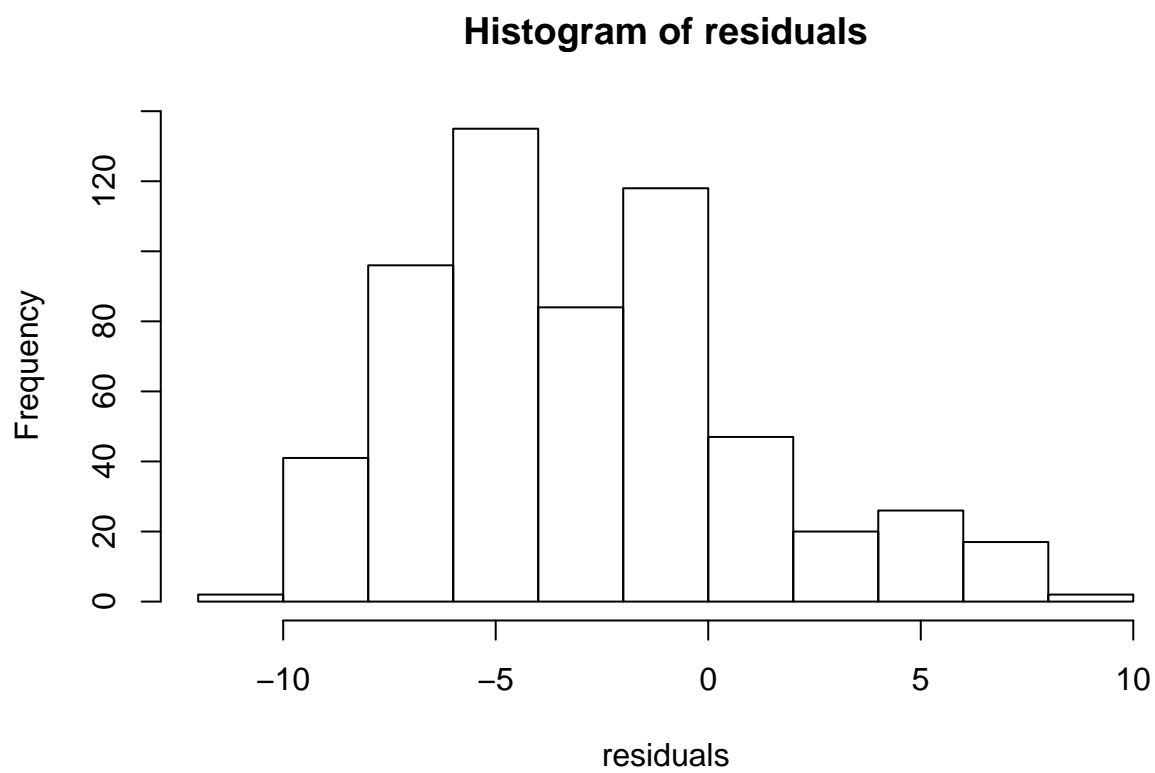
**Ensemble (all.regr.ext.forecast[,i], all.regr.add.forecast[,i], all.hw.forecast[,i])**

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1	Theil's U
Training set	0.2337461	6.000984	4.687606	-17.34201	40.70483	0.9219997	0.2788951	NA
Test set	-2.9780467	4.854122	4.149092	-51.38869	58.92879	0.8151462	-0.1550379	0.9094339
<pre> \(\forecast\_is      sues\_files/fi    gure-latex/ unnamed-chu      nk-47-1.pdf) </pre>								

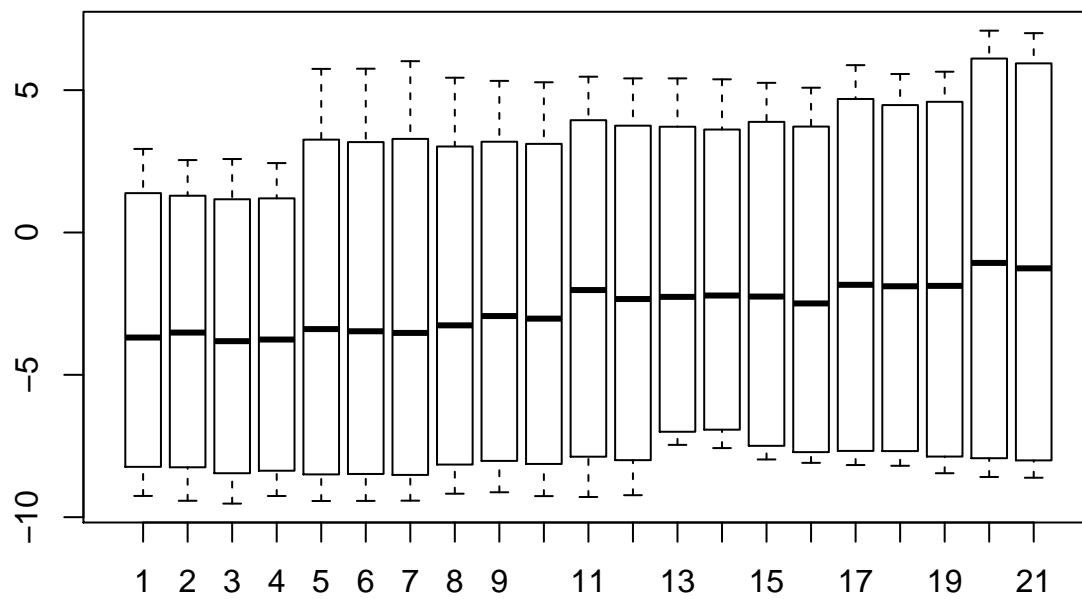
```
## NULL
```



## NULL



##	97.5%	95%	5%	2.5%
##	6.275036	5.234703	-8.967777	-9.330981



## 97.5% 95% 5% 2.5%  
 ## 6.275036 5.234703 -8.967777 -9.330981