

Test

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```
library(readr)
library(Metrics) # RMSE/RMSLE

## Warning: package 'Metrics' was built under R version 4.0.5

library(dplyr)

## Warning: package 'dplyr' was built under R version 4.0.5
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##   filter, lag
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(ggplot2)
library(dgof) #ks.test

##
## Attaching package: 'dgof'
## The following object is masked from 'package:stats':
##
##   ks.test

library(fitdistrplus) #MLE

## Warning: package 'fitdistrplus' was built under R version 4.0.5
## Loading required package: MASS
## Warning: package 'MASS' was built under R version 4.0.4
##
## Attaching package: 'MASS'
## The following object is masked from 'package:dplyr':
##
##   select
## Loading required package: survival

library(actuar)

## Warning: package 'actuar' was built under R version 4.0.5
```

```
##
## Attaching package: 'actuar'

## The following object is masked from 'package:grDevices':
##
##      cm

library(stringr)

## Warning: package 'stringr' was built under R version 4.0.5

library(SuppDists)
library(dplyr)
library(splitstackshape)

## Warning: package 'splitstackshape' was built under R version 4.0.5

library(EnvStats)

## Warning: package 'EnvStats' was built under R version 4.0.5

##
## Attaching package: 'EnvStats'

## The following objects are masked from 'package:actuar':
##
##      dpareto, ppareto, qpareto, rpareto

## The following object is masked from 'package:MASS':
##
##      boxcox

## The following objects are masked from 'package:stats':
##
##      predict, predict.lm

## The following object is masked from 'package:base':
##
##      print.default
```

Cleaning

```
data <- read_csv("laptop_price.csv")

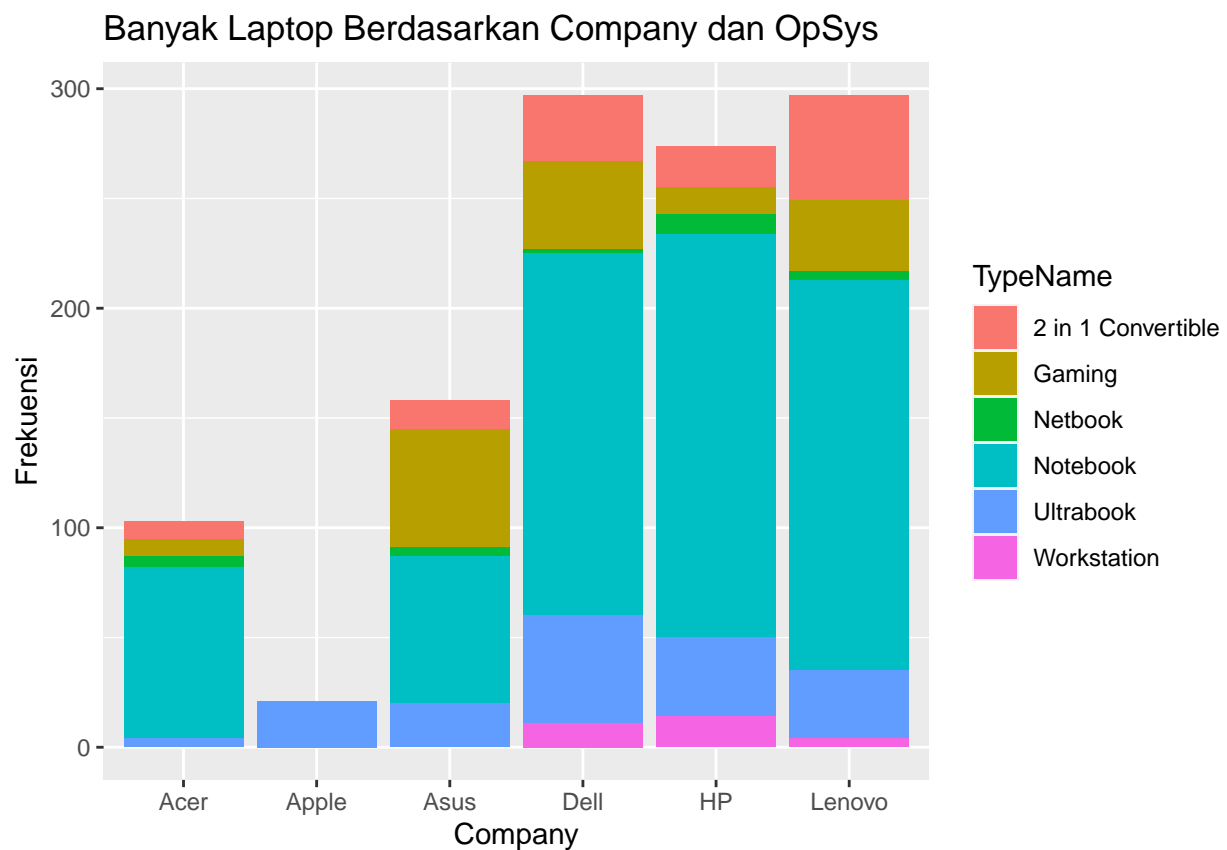
##
## -- Column specification -----
## cols(
##   laptop_ID = col_double(),
##   Company = col_character(),
##   Product = col_character(),
##   TypeName = col_character(),
##   Inches = col_double(),
##   ScreenResolution = col_character(),
##   Cpu = col_character(),
##   Ram = col_character(),
##   Memory = col_character(),
##   Gpu = col_character(),
##   OpSys = col_character(),
```

```
## Weight = col_character(),
## Price_euros = col_double()
## )

company <- c('Dell','Lenovo','HP','Asus','Acer', 'Apple')
data <- data %>% filter(Company %in% company)

library(ggplot2)

ggplot(data) +
  aes(x = Company, fill = TypeName) +
  geom_bar() +
  scale_fill_hue() +
  labs(y = "Frekuensi", title = "Banyak Laptop Berdasarkan Company dan OpSys") +
  theme_gray()
```



```
ggsave('barplot_inter1.png')
```

```
## Saving 6.5 x 4.5 in image
```

Cleanning Screen Resolution

```
data$ScreenType <- ''
for (i in 1:nrow(data)){
  vec <- str_split(data$ScreenResolution[i], ' ', simplify = TRUE)
  n <- length(vec)
  if (n > 2){
```

```

    m <- n-1
    temp <- vec[1,1]
    for (j in 2:m){
      temp <- paste(temp,vec[1,j])
    }
    data$ScreenType[i] <- temp
    data$ScreenResolution[i] <- vec[1,n]
  }
  else if (n == 2){
    data$ScreenType[i] <- vec[1,1]
    data$ScreenResolution[i] <- vec[1,2]
  }
}
data %>% count(ScreenResolution, sort = T)

```

```

## # A tibble: 11 x 2
##   ScreenResolution      n
##   <chr>              <int>
## 1 1920x1080           728
## 2 1366x768           288
## 3 3840x2160           37
## 4 3200x1800           27
## 5 1600x900            23
## 6 2560x1440           23
## 7 2304x1440            6
## 8 2560x1600            6
## 9 1440x900             4
## 10 1920x1200           4
## 11 2880x1800           4

```

```
data %>% count(ScreenType, sort = T)
```

```

## # A tibble: 20 x 2
##   ScreenType              n
##   <chr>                  <int>
## 1 "Full HD"              436
## 2 ""                    294
## 3 "IPS Panel Full HD"    201
## 4 "IPS Panel Full HD / Touchscreen" 49
## 5 "Full HD / Touchscreen" 41
## 6 "Touchscreen"         23
## 7 "IPS Panel Retina Display" 16
## 8 "Quad HD+ / Touchscreen" 15
## 9 "IPS Panel Touchscreen" 12
## 10 "IPS Panel 4K Ultra HD" 11
## 11 "IPS Panel"           10
## 12 "IPS Panel 4K Ultra HD / Touchscreen" 10
## 13 "4K Ultra HD / Touchscreen" 8
## 14 "4K Ultra HD"         6
## 15 "IPS Panel Quad HD+ / Touchscreen" 6
## 16 "IPS Panel Quad HD+" 5
## 17 "Quad HD+"            3
## 18 "IPS Panel Touchscreen / 4K Ultra HD" 2
## 19 "Touchscreen / Full HD" 1

```

Cleanning CPU Type

```
data$Cpu_Type <- ''
data$Cpu_Series <- ''
data$Cpu_Speed <- ''
for (i in 1:nrow(data)){
  vec <- str_split(data$Cpu[i], ' ',simplify =TRUE)
  n <- length(vec)
  data$Cpu_Type[i] <- vec[1,1]
  data$Cpu_Speed[i] <- vec[1,n]
  n <- n-1
  temp <- vec[1,2]
  for (j in 3:n){
    temp <- paste(temp,vec[1,j])
  }
  data$Cpu_Series[i] <- temp
}
```

Cleanning GPU Type

```
data$Gpu_Type <- ''
data$Gpu_Series <- ''
for (i in 1:nrow(data)){
  data$Gpu_Type[i] <- str_split(data$Gpu[i], ' ', n=2)[[1]][1]
  data$Gpu_Series[i] <- str_split(data$Gpu[i], ' ', n=2)[[1]][2]
}
```

Cleanning Memory

```
data$Memory_1 <- ''
data$Memory_2 <- ''
for (i in 1:nrow(data)){
  data$Memory_1[i] <- sub(' +', '',str_split(data$Memory, ' + ', n=2)[[i]][1],fixed=TRUE)
  data$Memory_2[i] <- str_split(data$Memory, ' + ', n=2)[[i]][2]
}
data$Memory_2[is.na(data$Memory_2)] = 0
data[which(data$Memory_1 == '1.0TB HDD'),]$Memory_1 = '1TB HDD'

data$Memory_1_Type <- ''
data$Memory_1_Size <- ''
data$Memory_2_Type <- ''
data$Memory_2_Size <- ''

for (i in 1:nrow(data)){
  data$Memory_1_Type[i] <- str_split(data$Memory_1[i], ' ', 2, simplify= T)[1,2]
  data$Memory_1_Size[i] <- str_split(data$Memory_1[i], ' ', 2, simplify= T)[1,1]

  data$Memory_2_Type[i] <- str_split(data$Memory_2[i], ' ', 2, simplify= T)[1,2]
  data$Memory_2_Size[i] <- str_split(data$Memory_2[i], ' ', 2, simplify= T)[1,1]
}
data[which(data$Memory_1 == '1.0TB HDD'),]$Memory_1 = '1TB HDD'
```

```

data[which(data$Memory_1_Size == '1.0TB'),]$Memory_1_Size = '1TB'
data[which(data$Memory_1_Size == '1TB'),]$Memory_1_Size = '1024GB'
data[which(data$Memory_1_Size == '2TB'),]$Memory_1_Size = '2048GB'

data[which(data$Memory_2_Size == '1.0TB'),]$Memory_2_Size = '1TB'
data[which(data$Memory_2_Size == '1TB'),]$Memory_2_Size = '1024GB'
data[which(data$Memory_2_Size == '2TB'),]$Memory_2_Size = '2048GB'

data$Memory_1_Size <- sub('GB', "", data$Memory_1_Size, fixed = TRUE)
data$Memory_1_Size <- as.numeric(data$Memory_1_Size)
data$Memory_2_Size <- sub('GB', "", data$Memory_2_Size, fixed = TRUE)
data$Memory_2_Size <- as.numeric(data$Memory_2_Size)

```

Cleanning Ram

```

data$Ram <- as.numeric(sub('GB', "", data$Ram, fixed = TRUE))
data$Cpu_Speed <- as.numeric(sub('GHz', '', data$Cpu_Speed, fixed=TRUE))

```

Factoring

```

data$Company <- factor(data$Company)
data$Product <- factor(data$Product)
data$TypeName <- factor(data$TypeName)
data$ScreenType <- factor(data$ScreenType)
data$ScreenResolution <- factor(data$ScreenResolution)
data$ScreenType <- relevel(data$ScreenType, 'Full HD')
data %>% count(ScreenType, sort = T)

```

```

## # A tibble: 20 x 2
##   ScreenType                n
##   <fct>                  <int>
## 1 "Full HD"                436
## 2 ""                      294
## 3 "IPS Panel Full HD"      201
## 4 "IPS Panel Full HD / Touchscreen"  49
## 5 "Full HD / Touchscreen"  41
## 6 "Touchscreen"           23
## 7 "IPS Panel Retina Display"  16
## 8 "Quad HD+ / Touchscreen"  15
## 9 "IPS Panel Touchscreen"   12
## 10 "IPS Panel 4K Ultra HD"  11
## 11 "IPS Panel"              10
## 12 "IPS Panel 4K Ultra HD / Touchscreen"  10
## 13 "4K Ultra HD / Touchscreen"  8
## 14 "4K Ultra HD"           6
## 15 "IPS Panel Quad HD+ / Touchscreen"  6
## 16 "IPS Panel Quad HD+"     5
## 17 "Quad HD+"              3
## 18 "IPS Panel Touchscreen / 4K Ultra HD"  2
## 19 "Touchscreen / Full HD"  1
## 20 "Touchscreen / Quad HD+"  1

```

```

data$Memory <- factor(data$Memory)
data$Gpu <- factor(data$Cpu)
data$OpSys <- factor(data$OpSys)
data$Memory_1 <- factor(data$Memory_1)
data$Memory_2 <- factor(data$Memory_2)
data$Gpu_Type <- factor(data$Gpu_Type)
data$Gpu_Series <- factor(data$Gpu_Series)
data$Weight <- as.numeric(str_remove(data$Weight, 'kg'))

```

```
head(data$Weight)
```

```
## [1] 1.37 1.34 1.86 1.83 1.37 2.10
```

Relevelling

```
data %>% count(Company, sort = TRUE)
```

```
## # A tibble: 6 x 2
##   Company      n
##   <fct>    <int>
## 1 Dell      297
## 2 Lenovo    297
## 3 HP        274
## 4 Asus      158
## 5 Acer      103
## 6 Apple      21
```

```
data$Company <- relevel(data$Company, 'Dell')
```

```
data %>% count(Product, sort = TRUE)
```

```
## # A tibble: 506 x 2
##   Product      n
##   <fct>    <int>
## 1 XPS 13      30
## 2 Inspiron 3567 29
## 3 250 G6      21
## 4 Legion Y520-15IKBN 19
## 5 Vostro 3568  19
## 6 Inspiron 5570 18
## 7 ProBook 450  18
## 8 Alienware 17 15
## 9 Inspiron 5567 14
## 10 Aspire 3    12
## # ... with 496 more rows
```

```
data$Product <- relevel(data$Product, 'XPS 13')
```

```
data %>% count(TypeName, sort = TRUE)
```

```
## # A tibble: 6 x 2
##   TypeName      n
##   <fct>    <int>
## 1 Notebook    672
## 2 Ultrabook   161
## 3 Gaming     146
```

```
## 4 2 in 1 Convertible    118
## 5 Workstation           29
## 6 Netbook               24
```

```
data$TypeName <- relevel(data$TypeName, 'Notebook')
```

```
data %>% count(ScreenResolution, sort = TRUE)
```

```
## # A tibble: 11 x 2
##   ScreenResolution     n
##   <fct>             <int>
## 1 1920x1080           728
## 2 1366x768           288
## 3 3840x2160           37
## 4 3200x1800           27
## 5 1600x900            23
## 6 2560x1440           23
## 7 2304x1440            6
## 8 2560x1600            6
## 9 1440x900             4
## 10 1920x1200           4
## 11 2880x1800           4
```

```
data$ScreenResolution <- relevel(data$ScreenResolution, '1920x1080')
```

```
data %>% count(Gpu_Series, sort = TRUE)
```

```
## # A tibble: 102 x 2
##   Gpu_Series           n
##   <fct>             <int>
## 1 HD Graphics 620     250
## 2 HD Graphics 520     160
## 3 UHD Graphics 620     68
## 4 GeForce GTX 1050     53
## 5 GeForce 940MX        41
## 6 Radeon 530           41
## 7 HD Graphics 400      33
## 8 HD Graphics 500      33
## 9 GeForce GTX 1060      31
## 10 GeForce 930MX        25
## # ... with 92 more rows
```

```
data$Gpu_Series <- relevel(data$Gpu_Series, 'HD Graphics 620')
```

```
data %>% count(OpSys, sort = TRUE)
```

```
## # A tibble: 9 x 2
##   OpSys           n
##   <fct>         <int>
## 1 Windows 10     935
## 2 No OS           63
## 3 Linux           62
## 4 Windows 7       43
## 5 Chrome OS       22
## 6 macOS           13
## 7 Mac OS X         8
## 8 Android          2
```



```
## 9 Windows 10 S      2
data$OpSys <- relevel(data$OpSys, 'Windows 10')

data %>% count(Gpu_Type, sort = TRUE)

## # A tibble: 3 x 2
##   Gpu_Type      n
##   <fct>      <int>
## 1 Intel      642
## 2 Nvidia    329
## 3 AMD       179

data$Gpu_Type <- relevel(factor(data$Gpu_Type), 'Intel')

data %>% count(Gpu_Series, sort = TRUE)

## # A tibble: 102 x 2
##   Gpu_Series      n
##   <fct>          <int>
## 1 HD Graphics 620    250
## 2 HD Graphics 520    160
## 3 UHD Graphics 620     68
## 4 GeForce GTX 1050    53
## 5 GeForce 940MX      41
## 6 Radeon 530         41
## 7 HD Graphics 400     33
## 8 HD Graphics 500     33
## 9 GeForce GTX 1060    31
## 10 GeForce 930MX      25
## # ... with 92 more rows

data$Gpu_Series <- relevel(factor(data$Gpu_Series), 'HD Graphics 620')

data %>% count(Cpu_Type, sort = TRUE)

## # A tibble: 2 x 2
##   Cpu_Type      n
##   <chr>      <int>
## 1 Intel    1088
## 2 AMD       62

data$Cpu_Type <- relevel(factor(data$Cpu_Type), 'Intel')

data %>% count(Cpu_Series, sort = TRUE)

## # A tibble: 85 x 2
##   Cpu_Series      n
##   <chr>          <int>
## 1 Core i5 7200U    175
## 2 Core i7 7500U    120
## 3 Core i7 7700HQ   113
## 4 Core i3 6006U     80
## 5 Core i5 8250U     71
## 6 Core i7 8550U     71
## 7 Core i5 6200U     51
## 8 Core i7 6500U     42
## 9 Core i3 7100U     35
```

```

## 10 Core i7 6700HQ      32
## # ... with 75 more rows

data$Cpu_Series <- relevel(factor(data$Cpu_Series), 'Core i5 7200U')

#data %>% count(Cpu_Speed, sort = TRUE)
#data$Cpu_Speed <- relevel(factor(data$Cpu_Speed), '2.5GHz')

data %>% count(Memory_1_Type, sort = TRUE)

## # A tibble: 4 x 2
##   Memory_1_Type      n
##   <chr>          <int>
## 1 SSD            713
## 2 HDD            363
## 3 Flash Storage   64
## 4 Hybrid         10

data$Memory_1_Type <- relevel(factor(data$Memory_1_Type), 'SSD')

data %>% count(Memory_2_Type, sort = TRUE)

## # A tibble: 4 x 2
##   Memory_2_Type      n
##   <chr>          <int>
## 1 ""             991
## 2 "HDD"          153
## 3 "SSD"           4
## 4 "Hybrid"        2

data$Memory_2_Type <- relevel(factor(data$Memory_2_Type), '')

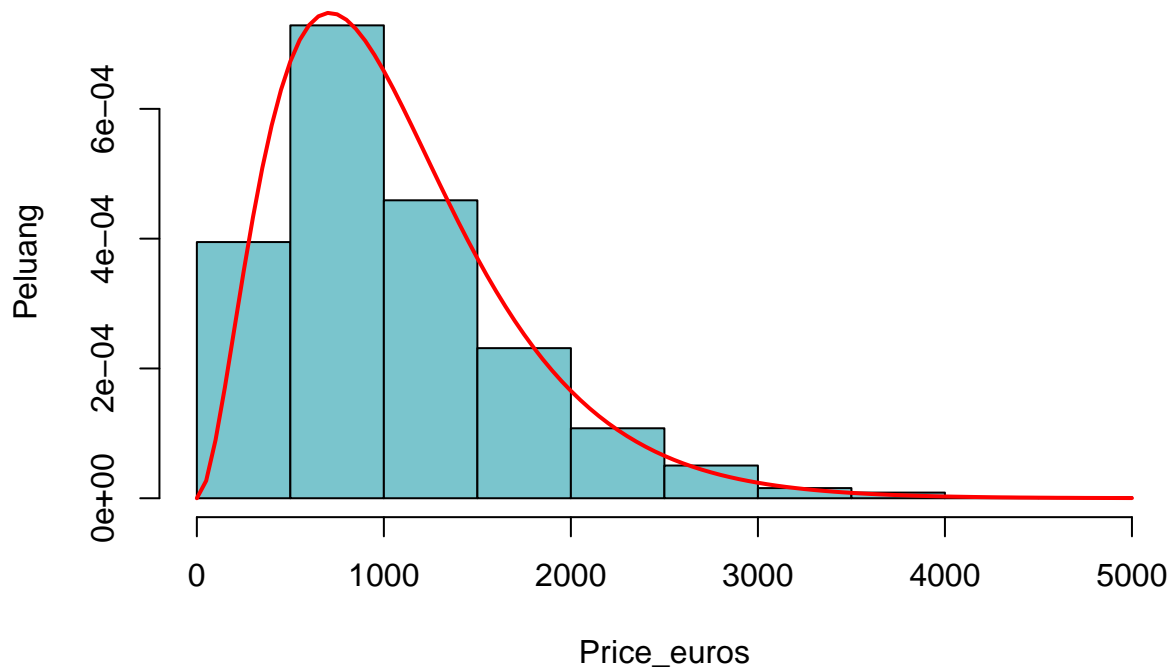
summary(fitdist(data$Price_euros, "gamma"))

## Fitting of the distribution ' gamma ' by maximum likelihood
## Parameters :
##           estimate   Std. Error
## shape 2.928053153 7.735577e-02
## rate  0.002717365 6.524717e-05
## Loglikelihood: -8901.67   AIC:  17807.34   BIC:  17817.44
## Correlation matrix:
##           shape      rate
## shape 1.0000000 0.8014826
## rate  0.8014826 1.0000000

h = hist(data$Price_euros, probability = T, main = paste("Harga Laptop dengan Distribusi Gamma"), col = "cad
curve(dgamma(x, shape = 2.928053153, rate = 0.002717365), add = TRUE, lwd = 2, col = "red")

```

Harga Laptop dengan Distribusi Gamma



EDA

```
set.seed(10818015)
ks.test(data$Price_euros,rgamma(nrow(data),shape = 2.928053153,rate = 0.002717365),alternative = "two.s

## Warning in ks.test(data$Price_euros, rgamma(nrow(data), shape = 2.928053153, :
## cannot compute correct p-values with ties

##
## Two-sample Kolmogorov-Smirnov test
##
## data: data$Price_euros and rgamma(nrow(data), shape = 2.928053153, rate = 0.002717365)
## D = 0.051304, p-value = 0.09691
## alternative hypothesis: two-sided

set.seed(181815)
temp <- stratified(data, group =25, size = 0.8, bothSets = T)
train <- as.data.frame(temp$SAMP1)
test <- as.data.frame(temp$SAMP2)

modell=step(glm(Price_euros ~ Company + TypeName + Inches +
  ScreenResolution + ScreenType + Cpu_Series+ Cpu_Type +
  Cpu_Speed + Ram + Memory_1_Type + Memory_1_Size +
  Memory_2_Type + Memory_2_Size + Gpu_Series+Gpu_Type+
  OpSys,
  family = Gamma(link ="log"),
```

```

data=train),direction ="both",trace = F)
summary(model1)

##
## Call:
## glm(formula = Price_euros ~ Company + TypeName + Inches + ScreenResolution +
##      Cpu_Series + Ram + Memory_1_Type + Memory_2_Type + Gpu_Series +
##      OpSys, family = Gamma(link = "log"), data = train)
##
## Deviance Residuals:
##      Min        1Q      Median        3Q        Max
## -0.66560  -0.12985  -0.00597   0.09699   0.83760
##
## Coefficients: (22 not defined because of singularities)
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      7.288479    0.157711  46.214 < 2e-16 ***
## CompanyAcer      -0.116251    0.034673  -3.353 0.000841 ***
## CompanyApple      0.051448    0.224876   0.229 0.819099
## CompanyAsus      -0.018813    0.030481  -0.617 0.537299
## CompanyHP         0.043583    0.025594   1.703 0.089017 .
## CompanyLenovo    -0.003124    0.027006  -0.116 0.907949
## TypeName2 in 1 Convertible  0.131432    0.031646   4.153 3.66e-05 ***
## TypeNameGaming   -0.104748    0.061204  -1.711 0.087418 .
## TypeNameNetbook  -0.021679    0.064037  -0.339 0.735054
## TypeNameUltrabook  0.232265    0.031625   7.344 5.49e-13 ***
## TypeNameWorkstation 0.011561    0.153152   0.075 0.939846
## Inches          -0.039716    0.010490  -3.786 0.000165 ***
## ScreenResolution1366x768 -0.115251    0.025973  -4.437 1.05e-05 ***
## ScreenResolution1440x900 -0.068037    0.264314  -0.257 0.796934
## ScreenResolution1600x900  0.041262    0.067343   0.613 0.540258
## ScreenResolution1920x1200 -0.385954    0.265358  -1.454 0.146242
## ScreenResolution2304x1440 -0.135991    0.309322  -0.440 0.660325
## ScreenResolution2560x1440  0.338547    0.065727   5.151 3.33e-07 ***
## ScreenResolution2560x1600  0.272410    0.309401   0.880 0.378907
## ScreenResolution2880x1800  0.634990    0.311814   2.036 0.042063 *
## ScreenResolution3200x1800  0.043428    0.058830   0.738 0.460634
## ScreenResolution3840x2160  0.281455    0.053645   5.247 2.03e-07 ***
## Cpu_SeriesA10-Series 9600P -0.141581    0.311514  -0.454 0.649608
## Cpu_SeriesA10-Series 9620P -0.144803    0.217850  -0.665 0.506456
## Cpu_SeriesA12-Series 9700P -0.221808    0.216523  -1.024 0.305978
## Cpu_SeriesA12-Series 9720P -0.138569    0.165807  -0.836 0.403581
## Cpu_SeriesA4-Series 7210   -0.680112    0.225029  -3.022 0.002595 **
## Cpu_SeriesA6-Series 7310   -0.663334    0.325022  -2.041 0.041617 *
## Cpu_SeriesA6-Series 9220   -0.404357    0.187970  -2.151 0.031786 *
## Cpu_SeriesA6-Series A6-9220 -0.402611    0.187779  -2.144 0.032354 *
## Cpu_SeriesA8-Series 7410   -0.486081    0.178548  -2.722 0.006634 **
## Cpu_SeriesA9-Series 9410   -0.189258    0.297283  -0.637 0.524565
## Cpu_SeriesA9-Series 9420   -0.466446    0.112554  -4.144 3.81e-05 ***
## Cpu_SeriesA9-Series A9-9420 -0.229623    0.161238  -1.424 0.154835
## Cpu_SeriesAtom x5-Z8350    -1.072696    0.304209  -3.526 0.000448 ***
## Cpu_SeriesAtom x5-Z8550      NA          NA      NA      NA
## Cpu_SeriesCeleron Dual Core 3205U -1.065502    0.183145  -5.818 8.88e-09 ***
## Cpu_SeriesCeleron Dual Core 3855U -0.690426    0.160444  -4.303 1.91e-05 ***
## Cpu_SeriesCeleron Dual Core N3050 -0.561402    0.143937  -3.900 0.000105 ***

```

## Cpu_SeriesCeleron Dual Core N3060	-0.682115	0.196405	-3.473	0.000545	***
## Cpu_SeriesCeleron Dual Core N3350	-0.762165	0.060243	-12.651	< 2e-16	***
## Cpu_SeriesCeleron Quad Core N3160	-0.688908	0.261953	-2.630	0.008719	**
## Cpu_SeriesCeleron Quad Core N3450	-0.569959	0.158164	-3.604	0.000335	***
## Cpu_SeriesCore i3 6006U	-0.248711	0.052462	-4.741	2.56e-06	***
## Cpu_SeriesCore i3 6100U	-0.122220	0.097358	-1.255	0.209744	
## Cpu_SeriesCore i3 7100U	-0.310468	0.044854	-6.922	9.70e-12	***
## Cpu_SeriesCore i3 7130U	-0.283246	0.097572	-2.903	0.003807	**
## Cpu_SeriesCore i5	NA	NA	NA	NA	
## Cpu_SeriesCore i5 6200U	0.169565	0.070278	2.413	0.016074	*
## Cpu_SeriesCore i5 6300HQ	0.150439	0.116394	1.292	0.196592	
## Cpu_SeriesCore i5 6300U	0.347684	0.096431	3.606	0.000332	***
## Cpu_SeriesCore i5 6440HQ	0.472667	0.266275	1.775	0.076292	.
## Cpu_SeriesCore i5 7300HQ	0.280266	0.120752	2.321	0.020558	*
## Cpu_SeriesCore i5 7300U	0.285807	0.068689	4.161	3.54e-05	***
## Cpu_SeriesCore i5 7440HQ	0.253695	0.104747	2.422	0.015676	*
## Cpu_SeriesCore i5 7500U	-0.112316	0.217307	-0.517	0.605413	
## Cpu_SeriesCore i5 7Y54	0.270860	0.128368	2.110	0.035192	*
## Cpu_SeriesCore i5 8250U	0.005879	0.053418	0.110	0.912397	
## Cpu_SeriesCore i7	NA	NA	NA	NA	
## Cpu_SeriesCore i7 6500U	0.197035	0.069156	2.849	0.004506	**
## Cpu_SeriesCore i7 6560U	0.440505	0.377083	1.168	0.243108	
## Cpu_SeriesCore i7 6600U	0.267971	0.097870	2.738	0.006330	**
## Cpu_SeriesCore i7 6700HQ	0.399812	0.124330	3.216	0.001358	**
## Cpu_SeriesCore i7 6820HK	0.065969	0.223488	0.295	0.767941	
## Cpu_SeriesCore i7 6820HQ	0.361062	0.187547	1.925	0.054590	.
## Cpu_SeriesCore i7 7500U	0.157004	0.031888	4.924	1.05e-06	***
## Cpu_SeriesCore i7 7560U	0.288158	0.340547	0.846	0.397737	
## Cpu_SeriesCore i7 7600U	0.384431	0.073928	5.200	2.58e-07	***
## Cpu_SeriesCore i7 7660U	0.548687	0.344607	1.592	0.111766	
## Cpu_SeriesCore i7 7700HQ	0.382492	0.108894	3.513	0.000471	***
## Cpu_SeriesCore i7 7820HK	0.370314	0.222942	1.661	0.097131	.
## Cpu_SeriesCore i7 7820HQ	0.472841	0.159761	2.960	0.003178	**
## Cpu_SeriesCore i7 7Y75	0.309133	0.133652	2.313	0.020998	*
## Cpu_SeriesCore i7 8550U	0.113184	0.055593	2.036	0.042112	*
## Cpu_SeriesCore i7 8650U	-0.042462	0.274801	-0.155	0.877244	
## Cpu_SeriesCore M	0.139773	0.268560	0.520	0.602905	
## Cpu_SeriesCore M 6Y30	-0.673697	0.292648	-2.302	0.021608	*
## Cpu_SeriesCore M 6Y54	0.298866	0.344715	0.867	0.386226	
## Cpu_SeriesCore M 6Y75	0.233766	0.287039	0.814	0.415677	
## Cpu_SeriesCore M m3	NA	NA	NA	NA	
## Cpu_SeriesCore M M3-6Y30	-0.554989	0.351445	-1.579	0.114727	
## Cpu_SeriesCore M m7-6Y75	-0.090309	0.341480	-0.264	0.791497	
## Cpu_SeriesCore M M7-6Y75	-0.096041	0.351373	-0.273	0.784675	
## Cpu_SeriesE-Series 6110	-1.061387	0.217835	-4.872	1.35e-06	***
## Cpu_SeriesE-Series 7110	-0.763515	0.154444	-4.944	9.50e-07	***
## Cpu_SeriesE-Series 9000	-0.828209	0.216989	-3.817	0.000147	***
## Cpu_SeriesE-Series 9000e	-0.776266	0.216420	-3.587	0.000357	***
## Cpu_SeriesE-Series E2-6110	-1.129452	0.224175	-5.038	5.91e-07	***
## Cpu_SeriesE-Series E2-9000e	-0.835538	0.216572	-3.858	0.000124	***
## Cpu_SeriesFX 8800P	-0.094944	0.226563	-0.419	0.675292	
## Cpu_SeriesFX 9830P	-0.064396	0.225575	-0.285	0.775360	
## Cpu_SeriesPentium Dual Core 4405Y	-0.581769	0.356101	-1.634	0.102744	
## Cpu_SeriesPentium Dual Core N4200	-0.147666	0.284137	-0.520	0.603430	

## Cpu_SeriesPentium Quad Core N3700	-0.279343	0.247636	-1.128	0.259671	
## Cpu_SeriesPentium Quad Core N3710	-0.332264	0.170826	-1.945	0.052149	.
## Cpu_SeriesPentium Quad Core N4200	-0.172133	0.168266	-1.023	0.306652	
## Cpu_SeriesRyzen 1600	0.313304	0.324246	0.966	0.334234	
## Cpu_SeriesRyzen 1700	0.174496	0.272829	0.640	0.522643	
## Cpu_SeriesXeon E3-1505M V6	0.595632	0.279383	2.132	0.033340	*
## Cpu_SeriesXeon E3-1535M v5	1.267978	0.405699	3.125	0.001845	**
## Cpu_SeriesXeon E3-1535M v6	0.511029	0.314380	1.626	0.104480	
## Ram	0.022645	0.002826	8.013	4.37e-15	***
## Memory_1_TypeFlash Storage	-0.220925	0.057288	-3.856	0.000125	***
## Memory_1_TypeHDD	-0.112462	0.022954	-4.899	1.18e-06	***
## Memory_1_TypeHybrid	-0.166282	0.122153	-1.361	0.173846	
## Memory_2_TypeHDD	0.078340	0.036361	2.155	0.031523	*
## Memory_2_TypeHybrid	0.556091	0.273666	2.032	0.042511	*
## Memory_2_TypeSSD	0.225436	0.220070	1.024	0.305990	
## Gpu_SeriesFirePro W4190M	0.172894	0.136866	1.263	0.206903	
## Gpu_SeriesFirePro W5130M	NA	NA	NA	NA	
## Gpu_SeriesFirePro W6150M	0.664683	0.285877	2.325	0.020339	*
## Gpu_SeriesGeForce 150MX	0.127702	0.135625	0.942	0.346714	
## Gpu_SeriesGeForce 920	-0.241268	0.219720	-1.098	0.272531	
## Gpu_SeriesGeForce 920M	-0.201283	0.116052	-1.734	0.083261	.
## Gpu_SeriesGeForce 920MX	-0.124482	0.067090	-1.855	0.063928	.
## Gpu_SeriesGeForce 930MX	0.011646	0.056262	0.207	0.836068	
## Gpu_SeriesGeForce 940M	-0.391011	0.227847	-1.716	0.086560	.
## Gpu_SeriesGeForce 940MX	-0.068253	0.043493	-1.569	0.117011	
## Gpu_SeriesGeForce 960M	0.437025	0.253535	1.724	0.085177	.
## Gpu_SeriesGeForce GT 940MX	-0.122080	0.108541	-1.125	0.261064	
## Gpu_SeriesGeForce GTX 1050	-0.061975	0.121899	-0.508	0.611315	
## Gpu_SeriesGeForce GTX 1050 Ti	0.006138	0.135108	0.045	0.963779	
## Gpu_SeriesGeForce GTX 1050M	-0.065862	0.168373	-0.391	0.695787	
## Gpu_SeriesGeForce GTX 1050Ti	0.073892	0.246921	0.299	0.764832	
## Gpu_SeriesGeForce GTX 1060	0.202751	0.126904	1.598	0.110543	
## Gpu_SeriesGeForce GTX 1070	0.414617	0.141763	2.925	0.003553	**
## Gpu_SeriesGeForce GTX 1070M	0.503454	0.257524	1.955	0.050962	.
## Gpu_SeriesGeForce GTX 1080	0.685447	0.242908	2.822	0.004903	**
## Gpu_SeriesGeForce GTX 940MX	-0.231534	0.115643	-2.002	0.045634	*
## Gpu_SeriesGeForce GTX 950M	-0.030624	0.097042	-0.316	0.752417	
## Gpu_SeriesGeForce GTX 960	-0.133612	0.254130	-0.526	0.599211	
## Gpu_SeriesGeForce GTX 960<U+039C>	-0.237136	0.201689	-1.176	0.240073	
## Gpu_SeriesGeForce GTX 960M	-0.260021	0.134392	-1.935	0.053397	.
## Gpu_SeriesGeForce GTX 965M	-0.141111	0.205694	-0.686	0.492916	
## Gpu_SeriesGeForce GTX 970M	-0.066951	0.210298	-0.318	0.750302	
## Gpu_SeriesGeForce GTX 980M	0.347188	0.169465	2.049	0.040841	*
## Gpu_SeriesGeForce GTX1060	0.012337	0.248861	0.050	0.960475	
## Gpu_SeriesGeForce GTX1080	0.524321	0.251213	2.087	0.037216	*
## Gpu_SeriesGeForce MX130	0.027860	0.118161	0.236	0.813667	
## Gpu_SeriesGeForce MX150	-0.030736	0.084332	-0.364	0.715615	
## Gpu_SeriesGraphics 620	-0.206343	0.218674	-0.944	0.345678	
## Gpu_SeriesHD Graphics	-0.142335	0.119284	-1.193	0.233157	
## Gpu_SeriesHD Graphics 400	-0.166726	0.202257	-0.824	0.410020	
## Gpu_SeriesHD Graphics 405	-0.269333	0.196201	-1.373	0.170250	
## Gpu_SeriesHD Graphics 500	NA	NA	NA	NA	
## Gpu_SeriesHD Graphics 505	-0.317293	0.182453	-1.739	0.082445	.
## Gpu_SeriesHD Graphics 510	NA	NA	NA	NA	

## Gpu_SeriesHD Graphics 515	0.110502	0.262379	0.421	0.673765	
## Gpu_SeriesHD Graphics 520	-0.108240	0.057442	-1.884	0.059910	.
## Gpu_SeriesHD Graphics 530	-0.512094	0.261475	-1.958	0.050550	.
## Gpu_SeriesHD Graphics 5300	NA	NA	NA	NA	
## Gpu_SeriesHD Graphics 6000	NA	NA	NA	NA	
## Gpu_SeriesHD Graphics 615	NA	NA	NA	NA	
## Gpu_SeriesHD Graphics 630	-0.042188	0.135013	-0.312	0.754769	
## Gpu_SeriesIris Graphics 540	-0.239832	0.302969	-0.792	0.428845	
## Gpu_SeriesIris Graphics 550	0.082598	0.302969	0.273	0.785214	
## Gpu_SeriesIris Plus Graphics 640	-0.232726	0.262379	-0.887	0.375377	
## Gpu_SeriesIris Plus Graphics 650	NA	NA	NA	NA	
## Gpu_SeriesIris Pro Graphics	-0.068405	0.308338	-0.222	0.824491	
## Gpu_SeriesQuadro M1000M	-0.134336	0.284180	-0.473	0.636556	
## Gpu_SeriesQuadro M1200	0.423183	0.176859	2.393	0.016971	*
## Gpu_SeriesQuadro M2000M	-0.082370	0.297303	-0.277	0.781813	
## Gpu_SeriesQuadro M2200	0.333753	0.229981	1.451	0.147143	
## Gpu_SeriesQuadro M2200M	0.313874	0.220272	1.425	0.154597	
## Gpu_SeriesQuadro M3000M	0.861418	0.285168	3.021	0.002609	**
## Gpu_SeriesQuadro M520M	0.261606	0.211456	1.237	0.216419	
## Gpu_SeriesQuadro M620	0.282719	0.215393	1.313	0.189736	
## Gpu_SeriesQuadro M620M	0.844113	0.242229	3.485	0.000522	***
## Gpu_SeriesR17M-M1-70	-0.224555	0.218523	-1.028	0.304474	
## Gpu_SeriesRadeon 520	-0.234934	0.068598	-3.425	0.000649	***
## Gpu_SeriesRadeon 530	-0.128256	0.063749	-2.012	0.044595	*
## Gpu_SeriesRadeon Pro 555	-0.158136	0.302969	-0.522	0.601858	
## Gpu_SeriesRadeon Pro 560	NA	NA	NA	NA	
## Gpu_SeriesRadeon R2	NA	NA	NA	NA	
## Gpu_SeriesRadeon R2 Graphics	NA	NA	NA	NA	
## Gpu_SeriesRadeon R3	NA	NA	NA	NA	
## Gpu_SeriesRadeon R4	-0.168225	0.243051	-0.692	0.489066	
## Gpu_SeriesRadeon R4 Graphics	-0.269717	0.196741	-1.371	0.170816	
## Gpu_SeriesRadeon R5	-0.005672	0.144606	-0.039	0.968723	
## Gpu_SeriesRadeon R5 520	0.062807	0.223386	0.281	0.778667	
## Gpu_SeriesRadeon R5 M315	-0.238448	0.229608	-1.039	0.299377	
## Gpu_SeriesRadeon R5 M330	-0.237583	0.117445	-2.023	0.043441	*
## Gpu_SeriesRadeon R5 M420	0.007576	0.100846	0.075	0.940132	
## Gpu_SeriesRadeon R5 M420X	0.040773	0.136308	0.299	0.764931	
## Gpu_SeriesRadeon R5 M430	-0.169431	0.067756	-2.501	0.012613	*
## Gpu_SeriesRadeon R7	-0.419207	0.271193	-1.546	0.122584	
## Gpu_SeriesRadeon R7 Graphics	NA	NA	NA	NA	
## Gpu_SeriesRadeon R7 M365X	-0.155151	0.227049	-0.683	0.494610	
## Gpu_SeriesRadeon R7 M440	-0.182922	0.222827	-0.821	0.411962	
## Gpu_SeriesRadeon R7 M445	-0.112789	0.074829	-1.507	0.132166	
## Gpu_SeriesRadeon R7 M460	-0.120422	0.154160	-0.781	0.434966	
## Gpu_SeriesRadeon R9 M385	NA	NA	NA	NA	
## Gpu_SeriesRadeon RX 540	NA	NA	NA	NA	
## Gpu_SeriesRadeon RX 550	0.060460	0.119111	0.508	0.611887	
## Gpu_SeriesRadeon RX 560	NA	NA	NA	NA	
## Gpu_SeriesRadeon RX 580	0.384802	0.248101	1.551	0.121333	
## Gpu_SeriesUHD Graphics 620	-0.080103	0.057574	-1.391	0.164554	
## OpSysAndroid	-0.259587	0.214232	-1.212	0.226011	
## OpSysChrome OS	0.175968	0.088214	1.995	0.046435	*
## OpSysLinux	-0.135043	0.036724	-3.677	0.000253	***
## OpSysMac OS X	NA	NA	NA	NA	

```
## OpSysmacOS                NA          NA          NA          NA
## OpSysNo OS                -0.255714    0.035863   -7.130 2.39e-12 ***
## OpSysWindows 10 S         NA          NA          NA          NA
## OpSysWindows 7            0.182392    0.054102    3.371 0.000787 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for Gamma family taken to be 0.04589517)
##
## Null deviance: 334.137 on 920 degrees of freedom
## Residual deviance: 32.606 on 738 degrees of freedom
## AIC: 12450
##
## Number of Fisher Scoring iterations: 6
anova(model1, test="Chisq")
```

```
## Analysis of Deviance Table
##
## Model: Gamma, link: log
##
## Response: Price_euros
##
## Terms added sequentially (first to last)
##
##
##              Df Deviance Resid. Df Resid. Dev Pr(>Chi)
## NULL                920    334.14
## Company              5    25.009    915    309.13 < 2.2e-16 ***
## TypeName             5   107.890    910    201.24 < 2.2e-16 ***
## Inches               1     1.095    909    200.14 1.032e-06 ***
## ScreenResolution    10    70.219    899    129.92 < 2.2e-16 ***
## Cpu_Series          75    70.140    824     59.78 < 2.2e-16 ***
## Ram                 1     9.561    823     50.22 < 2.2e-16 ***
## Memory_1_Type       3     3.473    820     46.75 2.592e-16 ***
## Memory_2_Type       3     0.368    817     46.38 0.04551 *
## Gpu_Series          74    10.327    743     36.05 < 2.2e-16 ***
## OpSys               5     3.447    738     32.61 8.858e-15 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(model1)
```

```
## Waiting for profiling to be done...
```

```
##              2.5 %      97.5 %
## (Intercept)    6.9837242968  7.593535811
## CompanyAcer    -0.1848097016 -0.047257621
## CompanyApple   -0.3634531643  0.520172013
## CompanyAsus    -0.0791339472  0.041698054
## CompanyHP      -0.0071256392  0.094281872
## CompanyLenovo  -0.0563129010  0.050053650
## TypeName2 in 1 Convertible  0.0693522858  0.193924191
## TypeNameGaming -0.2276835842  0.016522676
## TypeNameNetbook -0.1434857863  0.102080911
## TypeNameUltrabook 0.1703749482  0.294356795
```


## TypeNameWorkstation	-0.2780445020	0.313951438
## Inches	-0.0600489636	-0.019382522
## ScreenResolution1366x768	-0.1668361120	-0.063548526
## ScreenResolution1440x900	-0.6035443016	0.438286626
## ScreenResolution1600x900	-0.0907982490	0.176338497
## ScreenResolution1920x1200	-0.8960286940	0.140717592
## ScreenResolution2304x1440	-0.7459702034	0.473998902
## ScreenResolution2560x1440	0.2133813415	0.466462389
## ScreenResolution2560x1600	-0.3377706174	0.882598821
## ScreenResolution2880x1800	0.0200946385	1.249890132
## ScreenResolution3200x1800	-0.0711629995	0.160936962
## ScreenResolution3840x2160	0.1773098608	0.387111442
## Cpu_SeriesA10-Series 9600P	-0.7561713711	0.473026713
## Cpu_SeriesA10-Series 9620P	-0.5456691516	0.313092172
## Cpu_SeriesA12-Series 9700P	-0.6195357296	0.233700244
## Cpu_SeriesA12-Series 9720P	-0.4537763057	0.200879671
## Cpu_SeriesA4-Series 7210	-1.0974234912	-0.209686453
## Cpu_SeriesA6-Series 7310	-1.2901624613	-0.009168056
## Cpu_SeriesA6-Series 9220	-0.7623215599	-0.021908547
## Cpu_SeriesA6-Series A6-9220	-0.7570919344	-0.019163233
## Cpu_SeriesA8-Series 7410	-0.8340586317	-0.131931483
## Cpu_SeriesA9-Series 9410	-0.7868112545	0.383289032
## Cpu_SeriesA9-Series 9420	-0.6847616903	-0.240043764
## Cpu_SeriesA9-Series A9-9420	-0.5341394302	0.100657400
## Cpu_SeriesAtom x5-Z8350	-1.6530193315	-0.457913980
## Cpu_SeriesAtom x5-Z8550	NA	NA
## Cpu_SeriesCeleron Dual Core 3205U	-1.4220389597	-0.710105140
## Cpu_SeriesCeleron Dual Core 3855U	-0.9937295546	-0.360683109
## Cpu_SeriesCeleron Dual Core N3050	-0.8436385751	-0.286123006
## Cpu_SeriesCeleron Dual Core N3060	-1.0591553515	-0.292022994
## Cpu_SeriesCeleron Dual Core N3350	-0.8769208127	-0.645764843
## Cpu_SeriesCeleron Quad Core N3160	-1.1912141456	-0.169694306
## Cpu_SeriesCeleron Quad Core N3450	-0.8672469332	-0.245709053
## Cpu_SeriesCore i3 6006U	-0.3518037975	-0.145139440
## Cpu_SeriesCore i3 6100U	-0.3119298392	0.073207551
## Cpu_SeriesCore i3 7100U	-0.3976260763	-0.221786517
## Cpu_SeriesCore i3 7130U	-0.4756560062	-0.082699530
## Cpu_SeriesCore i5	NA	NA
## Cpu_SeriesCore i5 6200U	0.0310838705	0.308420553
## Cpu_SeriesCore i5 6300HQ	-0.0713472023	0.380305177
## Cpu_SeriesCore i5 6300U	0.1606321714	0.539198191
## Cpu_SeriesCore i5 6440HQ	-0.0316453453	1.011578567
## Cpu_SeriesCore i5 7300HQ	0.0452275897	0.514287241
## Cpu_SeriesCore i5 7300U	0.1535042243	0.422805898
## Cpu_SeriesCore i5 7440HQ	0.0531215427	0.464520314
## Cpu_SeriesCore i5 7500U	-0.5116135588	0.344388740
## Cpu_SeriesCore i5 7Y54	0.0267995024	0.533004700
## Cpu_SeriesCore i5 8250U	-0.1002853611	0.113201867
## Cpu_SeriesCore i7	NA	NA
## Cpu_SeriesCore i7 6500U	0.0594732969	0.335136694
## Cpu_SeriesCore i7 6560U	-0.2925371252	1.192278332
## Cpu_SeriesCore i7 6600U	0.0786165883	0.459763105
## Cpu_SeriesCore i7 6700HQ	0.1562623673	0.642110371
## Cpu_SeriesCore i7 6820HK	-0.3515132581	0.502633768

## Cpu_SeriesCore i7 6820HQ	-0.0006901767	0.730812333
## Cpu_SeriesCore i7 7500U	0.0946721655	0.219521877
## Cpu_SeriesCore i7 7560U	-0.3608805463	0.977994647
## Cpu_SeriesCore i7 7600U	0.2404957067	0.533002585
## Cpu_SeriesCore i7 7660U	-0.1087962930	1.245932205
## Cpu_SeriesCore i7 7700HQ	0.1694111600	0.593963073
## Cpu_SeriesCore i7 7820HK	-0.0632952780	0.824966769
## Cpu_SeriesCore i7 7820HQ	0.1661892191	0.789541902
## Cpu_SeriesCore i7 7Y75	0.0536316938	0.581188106
## Cpu_SeriesCore i7 8550U	0.0017171453	0.225558980
## Cpu_SeriesCore i7 8650U	-0.5972906160	0.485391090
## Cpu_SeriesCore M	-0.4029031552	0.654066614
## Cpu_SeriesCore M 6Y30	-1.2600285117	-0.107802523
## Cpu_SeriesCore M 6Y54	-0.3773512988	0.980541035
## Cpu_SeriesCore M 6Y75	-0.3425907755	0.787295909
## Cpu_SeriesCore M m3	NA	NA
## Cpu_SeriesCore M M3-6Y30	-1.2433541997	0.138573495
## Cpu_SeriesCore M m7-6Y75	-0.7598636824	0.584893003
## Cpu_SeriesCore M M7-6Y75	-0.7842709941	0.597387767
## Cpu_SeriesE-Series 6110	-1.4620115805	-0.603673977
## Cpu_SeriesE-Series 7110	-1.0532083995	-0.445575628
## Cpu_SeriesE-Series 9000	-1.2269018413	-0.371963394
## Cpu_SeriesE-Series 9000e	-1.1736999857	-0.320982389
## Cpu_SeriesE-Series E2-6110	-1.5434097453	-0.661450674
## Cpu_SeriesE-Series E2-9000e	-1.2332612642	-0.380029569
## Cpu_SeriesFX 8800P	-0.5147927980	0.377817655
## Cpu_SeriesFX 9830P	-0.4822641067	0.406806650
## Cpu_SeriesPentium Dual Core 4405Y	-1.2794099523	0.120861637
## Cpu_SeriesPentium Dual Core N4200	-0.6859134006	0.431838918
## Cpu_SeriesPentium Quad Core N3700	-0.7448372902	0.227663180
## Cpu_SeriesPentium Quad Core N3710	-0.6548274290	0.012857606
## Cpu_SeriesPentium Quad Core N4200	-0.4917319265	0.170695167
## Cpu_SeriesRyzen 1600	-0.3258207430	0.952257227
## Cpu_SeriesRyzen 1700	-0.3786604847	0.694885208
## Cpu_SeriesXeon E3-1505M V6	0.0637434049	1.159112676
## Cpu_SeriesXeon E3-1535M v5	0.4730214785	2.062248597
## Cpu_SeriesXeon E3-1535M v6	-0.0946890258	1.139949960
## Ram	0.0170337301	0.028283928
## Memory_1_TypeFlash Storage	-0.3294043845	-0.111288882
## Memory_1_TypeHDD	-0.1581451683	-0.066770205
## Memory_1_TypeHybrid	-0.4009610670	0.079902663
## Memory_2_TypeHDD	0.0063968333	0.150558632
## Memory_2_TypeHybrid	0.0231146615	1.082903537
## Memory_2_TypeSSD	-0.1801246157	0.686911126
## Gpu_SeriesFirePro W4190M	-0.0816858165	0.445734941
## Gpu_SeriesFirePro W5130M	NA	NA
## Gpu_SeriesFirePro W6150M	0.1183509826	1.241166376
## Gpu_SeriesGeForce 150MX	-0.1319601513	0.403399480
## Gpu_SeriesGeForce 920	-0.6463687227	0.219863850
## Gpu_SeriesGeForce 920M	-0.4252794477	0.035478347
## Gpu_SeriesGeForce 920MX	-0.2557027683	0.010103160
## Gpu_SeriesGeForce 930MX	-0.0984345655	0.123735614
## Gpu_SeriesGeForce 940M	-0.8141313583	0.084181908
## Gpu_SeriesGeForce 940MX	-0.1533377261	0.018151203

## Gpu_SeriesGeForce 960M	-0.0403906954	0.955084343
## Gpu_SeriesGeForce GT 940MX	-0.3292064080	0.095607421
## Gpu_SeriesGeForce GTX 1050	-0.2976809754	0.175407868
## Gpu_SeriesGeForce GTX 1050 Ti	-0.2563046078	0.271028818
## Gpu_SeriesGeForce GTX 1050M	-0.3884256391	0.268229822
## Gpu_SeriesGeForce GTX 1050Ti	-0.3896462516	0.582362924
## Gpu_SeriesGeForce GTX 1060	-0.0438198864	0.451183320
## Gpu_SeriesGeForce GTX 1070	0.1406468927	0.690594757
## Gpu_SeriesGeForce GTX 1070M	0.0178206638	1.030480902
## Gpu_SeriesGeForce GTX 1080	0.2108363190	1.154103541
## Gpu_SeriesGeForce GTX 940MX	-0.4538894102	0.003260720
## Gpu_SeriesGeForce GTX 950M	-0.2186785000	0.163776946
## Gpu_SeriesGeForce GTX 960	-0.6114594723	0.386915643
## Gpu_SeriesGeForce GTX 960<U+039C>	-0.6238802519	0.167143631
## Gpu_SeriesGeForce GTX 960M	-0.5185845746	0.005435773
## Gpu_SeriesGeForce GTX 965M	-0.5349458591	0.269633596
## Gpu_SeriesGeForce GTX 970M	-0.4659385584	0.348519675
## Gpu_SeriesGeForce GTX 980M	0.0193818081	0.682237987
## Gpu_SeriesGeForce GTX1060	-0.4542865226	0.523299019
## Gpu_SeriesGeForce GTX1080	0.0521201398	1.039995463
## Gpu_SeriesGeForce MX130	-0.2061012161	0.268887063
## Gpu_SeriesGeForce MX150	-0.1980749231	0.140227422
## Gpu_SeriesGraphics 620	-0.6088338158	0.252797361
## Gpu_SeriesHD Graphics	-0.3661606509	0.094800800
## Gpu_SeriesHD Graphics 400	-0.5674289958	0.221932642
## Gpu_SeriesHD Graphics 405	-0.6602643871	0.107344813
## Gpu_SeriesHD Graphics 500	NA	NA
## Gpu_SeriesHD Graphics 505	-0.6855433489	0.032138937
## Gpu_SeriesHD Graphics 510	NA	NA
## Gpu_SeriesHD Graphics 515	-0.3918985895	0.642508452
## Gpu_SeriesHD Graphics 520	-0.2221659033	0.005787531
## Gpu_SeriesHD Graphics 530	-1.0055833867	0.021327257
## Gpu_SeriesHD Graphics 5300	NA	NA
## Gpu_SeriesHD Graphics 6000	NA	NA
## Gpu_SeriesHD Graphics 615	NA	NA
## Gpu_SeriesHD Graphics 630	-0.2990845934	0.226866071
## Gpu_SeriesIris Graphics 540	-0.8380331740	0.358368635
## Gpu_SeriesIris Graphics 550	-0.5156024810	0.680799328
## Gpu_SeriesIris Plus Graphics 640	-0.7647323343	0.269674707
## Gpu_SeriesIris Plus Graphics 650	NA	NA
## Gpu_SeriesIris Pro Graphics	-0.6763295542	0.539513643
## Gpu_SeriesQuadro M1000M	-0.6771370286	0.438992930
## Gpu_SeriesQuadro M1200	0.0758192128	0.763244228
## Gpu_SeriesQuadro M2000M	-0.6513829583	0.514559537
## Gpu_SeriesQuadro M2200	-0.1119606993	0.787252510
## Gpu_SeriesQuadro M2200M	-0.1128114842	0.749319598
## Gpu_SeriesQuadro M3000M	0.3166793684	1.436485500
## Gpu_SeriesQuadro M520M	-0.1448571014	0.676126635
## Gpu_SeriesQuadro M620	-0.1370650306	0.701747509
## Gpu_SeriesQuadro M620M	0.3914180142	1.343511753
## Gpu_SeriesR17M-M1-70	-0.6266703874	0.234308246
## Gpu_SeriesRadeon 520	-0.3692546072	-0.097431318
## Gpu_SeriesRadeon 530	-0.2571478737	0.001434583
## Gpu_SeriesRadeon Pro 555	-0.7563372400	0.440064569

```
## Gpu_SeriesRadeon Pro 560 NA NA
## Gpu_SeriesRadeon R2 NA NA
## Gpu_SeriesRadeon R2 Graphics NA NA
## Gpu_SeriesRadeon R3 NA NA
## Gpu_SeriesRadeon R4 -0.6500173950 0.310308096
## Gpu_SeriesRadeon R4 Graphics -0.6649250260 0.110578877
## Gpu_SeriesRadeon R5 -0.2917281619 0.279011491
## Gpu_SeriesRadeon R5 520 -0.3502537492 0.530115247
## Gpu_SeriesRadeon R5 M315 -0.6657139594 0.239986964
## Gpu_SeriesRadeon R5 M330 -0.4664479559 -0.002588240
## Gpu_SeriesRadeon R5 M420 -0.1881066352 0.211469728
## Gpu_SeriesRadeon R5 M420X -0.2191533177 0.316729571
## Gpu_SeriesRadeon R5 M430 -0.3027610406 -0.033459811
## Gpu_SeriesRadeon R7 -0.9407361646 0.130004045
## Gpu_SeriesRadeon R7 Graphics NA NA
## Gpu_SeriesRadeon R7 M365X -0.5764244633 0.318586776
## Gpu_SeriesRadeon R7 M440 -0.5946109978 0.283318446
## Gpu_SeriesRadeon R7 M445 -0.2573560230 0.036592587
## Gpu_SeriesRadeon R7 M460 -0.4090374819 0.196628254
## Gpu_SeriesRadeon R9 M385 NA NA
## Gpu_SeriesRadeon RX 540 NA NA
## Gpu_SeriesRadeon RX 550 -0.1687852966 0.301291019
## Gpu_SeriesRadeon RX 560 NA NA
## Gpu_SeriesRadeon RX 580 -0.0808279364 0.894974474
## Gpu_SeriesUHD Graphics 620 -0.1960237176 0.035232087
## OpSysAndroid -0.6810240156 0.161850873
## OpSysChrome OS 0.0015871100 0.353246440
## OpSysLinux -0.2074521844 -0.061809648
## OpSysMac OS X NA NA
## OpSysmacOS NA NA
## OpSysNo OS -0.3266932440 -0.184001466
## OpSysWindows 10 S NA NA
## OpSysWindows 7 0.0782911585 0.287785226
```

```
modellinv <- step(glm(Price_euros ~ Company + TypeName + Inches +
  ScreenResolution + ScreenType + Cpu_Series+ Cpu_Type +
  Cpu_Speed + Ram + Memory_1_Type + Memory_1_Size +
  Memory_2_Type + Memory_2_Size + Gpu_Series+Gpu_Type+
  OpSys,
  family = inverse.gaussian(link = "log"),
  data=train),direction = "both",trace = F)
summary(modellinv)
```

```
##
## Call:
## glm(formula = Price_euros ~ Company + TypeName + Inches + ScreenResolution +
##   ScreenType + Cpu_Series + Ram + Memory_1_Type + Memory_2_Size +
##   OpSys, family = inverse.gaussian(link = "log"), data = train)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -0.0273551 -0.0050405 -0.0005266  0.0031314  0.0278698
##
## Coefficients: (8 not defined because of singularities)
##                                Estimate Std. Error t value
```

## (Intercept)	7.030e+00	1.555e-01	45.196
## CompanyAcer	-1.008e-01	2.808e-02	-3.588
## CompanyApple	1.396e-01	5.078e-01	0.275
## CompanyAsus	-1.963e-02	2.783e-02	-0.706
## CompanyHP	4.620e-02	2.444e-02	1.890
## CompanyLenovo	-4.271e-02	2.624e-02	-1.628
## TypeName2 in 1 Convertible	1.183e-01	6.219e-02	1.902
## TypeNameGaming	-4.951e-02	6.835e-02	-0.724
## TypeNameNetbook	-1.363e-01	5.146e-02	-2.649
## TypeNameUltrabook	2.357e-01	3.838e-02	6.141
## TypeNameWorkstation	3.254e-01	9.370e-02	3.473
## Inches	-3.069e-02	1.016e-02	-3.021
## ScreenResolution1366x768	-2.234e-01	1.985e-01	-1.126
## ScreenResolution1440x900	-1.590e-01	5.719e-01	-0.278
## ScreenResolution1600x900	-7.344e-02	2.059e-01	-0.357
## ScreenResolution1920x1200	-4.906e-01	2.568e-01	-1.911
## ScreenResolution2304x1440	-1.493e-01	5.738e-01	-0.260
## ScreenResolution2560x1440	2.867e-01	2.172e-01	1.320
## ScreenResolution2560x1600	1.325e-01	5.245e-01	0.253
## ScreenResolution2880x1800	4.430e-01	4.268e-01	1.038
## ScreenResolution3200x1800	-7.502e-02	3.440e-01	-0.218
## ScreenResolution3840x2160	7.908e-01	3.762e-01	2.102
## ScreenType	1.269e-01	1.994e-01	0.636
## ScreenType4K Ultra HD	-7.158e-01	4.355e-01	-1.644
## ScreenType4K Ultra HD / Touchscreen	-5.287e-01	3.996e-01	-1.323
## ScreenTypeFull HD / Touchscreen	4.518e-02	7.243e-02	0.624
## ScreenTypeIPS Panel	2.350e-01	2.160e-01	1.088
## ScreenTypeIPS Panel 4K Ultra HD	-5.219e-01	4.022e-01	-1.298
## ScreenTypeIPS Panel 4K Ultra HD / Touchscreen	-4.772e-01	3.952e-01	-1.208
## ScreenTypeIPS Panel Full HD	1.393e-01	2.785e-02	5.002
## ScreenTypeIPS Panel Full HD / Touchscreen	4.590e-02	6.551e-02	0.701
## ScreenTypeIPS Panel Quad HD+	-6.606e-02	2.920e-01	-0.226
## ScreenTypeIPS Panel Quad HD+ / Touchscreen	1.023e-02	4.005e-01	0.026
## ScreenTypeIPS Panel Retina Display	NA	NA	NA
## ScreenTypeIPS Panel Touchscreen	1.830e-01	2.270e-01	0.806
## ScreenTypeIPS Panel Touchscreen / 4K Ultra HD	NA	NA	NA
## ScreenTypeQuad HD+	2.672e-01	4.311e-01	0.620
## ScreenTypeQuad HD+ / Touchscreen	2.455e-01	3.601e-01	0.682
## ScreenTypeTouchscreen	1.365e-01	2.085e-01	0.655
## ScreenTypeTouchscreen / Full HD	2.402e-01	2.882e-01	0.833
## Cpu_SeriesA10-Series 9600P	-4.279e-01	1.860e-01	-2.301
## Cpu_SeriesA10-Series 9620P	-1.432e-01	1.859e-01	-0.770
## Cpu_SeriesA12-Series 9700P	-2.073e-01	1.929e-01	-1.074
## Cpu_SeriesA12-Series 9720P	-3.141e-01	1.107e-01	-2.838
## Cpu_SeriesA4-Series 7210	-5.963e-01	1.581e-01	-3.772
## Cpu_SeriesA6-Series 7310	-7.389e-01	1.350e-01	-5.474
## Cpu_SeriesA6-Series 9220	-5.492e-01	6.188e-02	-8.876
## Cpu_SeriesA6-Series A6-9220	-6.012e-01	1.188e-01	-5.063
## Cpu_SeriesA8-Series 7410	-4.463e-01	8.524e-02	-5.236
## Cpu_SeriesA9-Series 9410	-2.399e-01	1.738e-01	-1.381
## Cpu_SeriesA9-Series 9420	-4.510e-01	5.379e-02	-8.384
## Cpu_SeriesA9-Series A9-9420	-4.047e-01	1.404e-01	-2.882
## Cpu_SeriesAtom x5-Z8350	-9.459e-01	1.210e-01	-7.817
## Cpu_SeriesAtom x5-Z8550	NA	NA	NA

## Cpu_SeriesCeleron Dual Core 3205U	-1.189e+00	8.727e-02	-13.624
## Cpu_SeriesCeleron Dual Core 3855U	-6.027e-01	1.078e-01	-5.591
## Cpu_SeriesCeleron Dual Core N3050	-6.027e-01	5.650e-02	-10.669
## Cpu_SeriesCeleron Dual Core N3060	-7.085e-01	4.259e-02	-16.636
## Cpu_SeriesCeleron Dual Core N3350	-6.372e-01	4.239e-02	-15.032
## Cpu_SeriesCeleron Quad Core N3160	-7.520e-01	1.243e-01	-6.051
## Cpu_SeriesCeleron Quad Core N3450	-4.430e-01	1.206e-01	-3.673
## Cpu_SeriesCore i3 6006U	-2.783e-01	2.971e-02	-9.369
## Cpu_SeriesCore i3 6100U	-1.884e-01	7.735e-02	-2.436
## Cpu_SeriesCore i3 7100U	-2.863e-01	3.975e-02	-7.201
## Cpu_SeriesCore i3 7130U	-2.464e-01	7.221e-02	-3.412
## Cpu_SeriesCore i5	NA	NA	NA
## Cpu_SeriesCore i5 6200U	9.470e-02	4.584e-02	2.066
## Cpu_SeriesCore i5 6300HQ	1.238e-01	1.050e-01	1.179
## Cpu_SeriesCore i5 6300U	2.973e-01	1.035e-01	2.873
## Cpu_SeriesCore i5 6440HQ	1.946e-01	2.978e-01	0.653
## Cpu_SeriesCore i5 7300HQ	2.267e-01	7.863e-02	2.884
## Cpu_SeriesCore i5 7300U	3.291e-01	8.443e-02	3.898
## Cpu_SeriesCore i5 7440HQ	3.288e-01	1.266e-01	2.598
## Cpu_SeriesCore i5 7500U	-2.225e-02	2.536e-01	-0.088
## Cpu_SeriesCore i5 7Y54	2.594e-01	1.819e-01	1.426
## Cpu_SeriesCore i5 8250U	-5.545e-02	3.651e-02	-1.519
## Cpu_SeriesCore i7	NA	NA	NA
## Cpu_SeriesCore i7 6500U	1.104e-01	5.508e-02	2.004
## Cpu_SeriesCore i7 6560U	3.561e-01	3.740e-01	0.952
## Cpu_SeriesCore i7 6600U	1.668e-01	1.189e-01	1.403
## Cpu_SeriesCore i7 6700HQ	3.150e-01	8.940e-02	3.524
## Cpu_SeriesCore i7 6820HK	5.401e-01	2.051e-01	2.634
## Cpu_SeriesCore i7 6820HQ	3.116e-01	2.067e-01	1.508
## Cpu_SeriesCore i7 7500U	1.333e-01	3.399e-02	3.921
## Cpu_SeriesCore i7 7560U	1.184e-01	2.853e-01	0.415
## Cpu_SeriesCore i7 7600U	3.726e-01	1.061e-01	3.513
## Cpu_SeriesCore i7 7660U	1.799e-01	3.761e-01	0.478
## Cpu_SeriesCore i7 7700HQ	4.387e-01	6.648e-02	6.599
## Cpu_SeriesCore i7 7820HK	8.805e-01	3.172e-01	2.776
## Cpu_SeriesCore i7 7820HQ	6.259e-01	1.608e-01	3.892
## Cpu_SeriesCore i7 7Y75	2.565e-01	2.086e-01	1.230
## Cpu_SeriesCore i7 8550U	5.690e-02	4.154e-02	1.370
## Cpu_SeriesCore i7 8650U	9.829e-02	2.090e-01	0.470
## Cpu_SeriesCore M	1.704e-01	5.445e-01	0.313
## Cpu_SeriesCore M 6Y30	-6.386e-01	1.276e-01	-5.006
## Cpu_SeriesCore M 6Y54	3.461e-01	3.328e-01	1.040
## Cpu_SeriesCore M 6Y75	5.127e-01	1.954e-01	2.624
## Cpu_SeriesCore M m3	NA	NA	NA
## Cpu_SeriesCore M M3-6Y30	-3.429e-01	2.132e-01	-1.608
## Cpu_SeriesCore M m7-6Y75	1.115e-01	2.794e-01	0.399
## Cpu_SeriesCore M M7-6Y75	1.252e-01	2.724e-01	0.460
## Cpu_SeriesE-Series 6110	-9.832e-01	1.321e-01	-7.443
## Cpu_SeriesE-Series 7110	-7.074e-01	1.008e-01	-7.018
## Cpu_SeriesE-Series 9000	-7.355e-01	1.352e-01	-5.441
## Cpu_SeriesE-Series 9000e	-7.258e-01	1.410e-01	-5.146
## Cpu_SeriesE-Series E2-6110	-9.722e-01	1.179e-01	-8.246
## Cpu_SeriesE-Series E2-9000e	-7.664e-01	1.449e-01	-5.288
## Cpu_SeriesFX 8800P	-2.513e-01	2.522e-01	-0.997

## Cpu_SeriesFX 9830P	-8.302e-02	2.145e-01	-0.387
## Cpu_SeriesPentium Dual Core 4405Y	-4.971e-01	3.277e-01	-1.517
## Cpu_SeriesPentium Dual Core N4200	-5.453e-01	2.717e-01	-2.007
## Cpu_SeriesPentium Quad Core N3700	-3.337e-01	1.548e-01	-2.155
## Cpu_SeriesPentium Quad Core N3710	-4.881e-01	6.396e-02	-7.630
## Cpu_SeriesPentium Quad Core N4200	-3.596e-01	5.411e-02	-6.646
## Cpu_SeriesRyzen 1600	6.989e-01	3.218e-01	2.172
## Cpu_SeriesRyzen 1700	4.487e-01	1.913e-01	2.346
## Cpu_SeriesXeon E3-1505M V6	6.961e-01	3.563e-01	1.953
## Cpu_SeriesXeon E3-1535M v5	6.366e-01	5.166e-01	1.232
## Cpu_SeriesXeon E3-1535M v6	7.069e-01	5.564e-01	1.271
## Ram	3.164e-02	3.421e-03	9.248
## Memory_1_TypeFlash Storage	-2.820e-01	3.929e-02	-7.176
## Memory_1_TypeHDD	-1.026e-01	2.103e-02	-4.878
## Memory_1_TypeHybrid	-2.375e-01	1.175e-01	-2.021
## Memory_2_Size	5.220e-05	3.103e-05	1.682
## OpSysAndroid	-2.596e-01	1.697e-01	-1.530
## OpSysChrome OS	2.139e-01	6.030e-02	3.547
## OpSysLinux	-1.699e-01	2.931e-02	-5.797
## OpSysMac OS X	6.858e-02	4.492e-01	0.153
## OpSysmacOS	NA	NA	NA
## OpSysNo OS	-2.512e-01	2.946e-02	-8.529
## OpSysWindows 10 S	NA	NA	NA
## OpSysWindows 7	2.340e-01	6.282e-02	3.725
##	Pr(> t)		
## (Intercept)	< 2e-16 ***		
## CompanyAcer	0.000353 ***		
## CompanyApple	0.783535		
## CompanyAsus	0.480691		
## CompanyHP	0.059126 .		
## CompanyLenovo	0.104013		
## TypeName2 in 1 Convertible	0.057578 .		
## TypeNameGaming	0.469059		
## TypeNameNetbook	0.008232 **		
## TypeNameUltrabook	1.29e-09 ***		
## TypeNameWorkstation	0.000542 ***		
## Inches	0.002600 **		
## ScreenResolution1366x768	0.260628		
## ScreenResolution1440x900	0.781126		
## ScreenResolution1600x900	0.721457		
## ScreenResolution1920x1200	0.056387 .		
## ScreenResolution2304x1440	0.794731		
## ScreenResolution2560x1440	0.187236		
## ScreenResolution2560x1600	0.800638		
## ScreenResolution2880x1800	0.299623		
## ScreenResolution3200x1800	0.827441		
## ScreenResolution3840x2160	0.035861 *		
## ScreenType	0.524803		
## ScreenType4K Ultra HD	0.100639		
## ScreenType4K Ultra HD / Touchscreen	0.186164		
## ScreenTypeFull HD / Touchscreen	0.532928		
## ScreenTypeIPS Panel	0.276914		
## ScreenTypeIPS Panel 4K Ultra HD	0.194761		
## ScreenTypeIPS Panel 4K Ultra HD / Touchscreen	0.227597		

## ScreenTypeIPS Panel Full HD	7.00e-07 ***
## ScreenTypeIPS Panel Full HD / Touchscreen	0.483700
## ScreenTypeIPS Panel Quad HD+	0.821087
## ScreenTypeIPS Panel Quad HD+ / Touchscreen	0.979636
## ScreenTypeIPS Panel Retina Display	NA
## ScreenTypeIPS Panel Touchscreen	0.420332
## ScreenTypeIPS Panel Touchscreen / 4K Ultra HD	NA
## ScreenTypeQuad HD+	0.535562
## ScreenTypeQuad HD+ / Touchscreen	0.495533
## ScreenTypeTouchscreen	0.512751
## ScreenTypeTouchscreen / Full HD	0.404972
## Cpu_SeriesA10-Series 9600P	0.021637 *
## Cpu_SeriesA10-Series 9620P	0.441474
## Cpu_SeriesA12-Series 9700P	0.282924
## Cpu_SeriesA12-Series 9720P	0.004654 **
## Cpu_SeriesA4-Series 7210	0.000174 ***
## Cpu_SeriesA6-Series 7310	5.89e-08 ***
## Cpu_SeriesA6-Series 9220	< 2e-16 ***
## Cpu_SeriesA6-Series A6-9220	5.13e-07 ***
## Cpu_SeriesA8-Series 7410	2.10e-07 ***
## Cpu_SeriesA9-Series 9410	0.167680
## Cpu_SeriesA9-Series 9420	2.31e-16 ***
## Cpu_SeriesA9-Series A9-9420	0.004063 **
## Cpu_SeriesAtom x5-Z8350	1.72e-14 ***
## Cpu_SeriesAtom x5-Z8550	NA
## Cpu_SeriesCeleron Dual Core 3205U	< 2e-16 ***
## Cpu_SeriesCeleron Dual Core 3855U	3.10e-08 ***
## Cpu_SeriesCeleron Dual Core N3050	< 2e-16 ***
## Cpu_SeriesCeleron Dual Core N3060	< 2e-16 ***
## Cpu_SeriesCeleron Dual Core N3350	< 2e-16 ***
## Cpu_SeriesCeleron Quad Core N3160	2.21e-09 ***
## Cpu_SeriesCeleron Quad Core N3450	0.000256 ***
## Cpu_SeriesCore i3 6006U	< 2e-16 ***
## Cpu_SeriesCore i3 6100U	0.015056 *
## Cpu_SeriesCore i3 7100U	1.38e-12 ***
## Cpu_SeriesCore i3 7130U	0.000678 ***
## Cpu_SeriesCore i5	NA
## Cpu_SeriesCore i5 6200U	0.039149 *
## Cpu_SeriesCore i5 6300HQ	0.238817
## Cpu_SeriesCore i5 6300U	0.004170 **
## Cpu_SeriesCore i5 6440HQ	0.513667
## Cpu_SeriesCore i5 7300HQ	0.004034 **
## Cpu_SeriesCore i5 7300U	0.000105 ***
## Cpu_SeriesCore i5 7440HQ	0.009561 **
## Cpu_SeriesCore i5 7500U	0.930097
## Cpu_SeriesCore i5 7Y54	0.154208
## Cpu_SeriesCore i5 8250U	0.129181
## Cpu_SeriesCore i7	NA
## Cpu_SeriesCore i7 6500U	0.045385 *
## Cpu_SeriesCore i7 6560U	0.341346
## Cpu_SeriesCore i7 6600U	0.161053
## Cpu_SeriesCore i7 6700HQ	0.000450 ***
## Cpu_SeriesCore i7 6820HK	0.008599 **
## Cpu_SeriesCore i7 6820HQ	0.132072


```

## Cpu_SeriesCore i7 7500U          9.56e-05 ***
## Cpu_SeriesCore i7 7560U          0.678080
## Cpu_SeriesCore i7 7600U          0.000469 ***
## Cpu_SeriesCore i7 7660U          0.632523
## Cpu_SeriesCore i7 7700HQ          7.54e-11 ***
## Cpu_SeriesCore i7 7820HK          0.005638 **
## Cpu_SeriesCore i7 7820HQ          0.000108 ***
## Cpu_SeriesCore i7 7Y75            0.219213
## Cpu_SeriesCore i7 8550U          0.171102
## Cpu_SeriesCore i7 8650U          0.638359
## Cpu_SeriesCore M                  0.754355
## Cpu_SeriesCore M 6Y30             6.83e-07 ***
## Cpu_SeriesCore M 6Y54             0.298732
## Cpu_SeriesCore M 6Y75             0.008869 **
## Cpu_SeriesCore M m3                NA
## Cpu_SeriesCore M M3-6Y30          0.108156
## Cpu_SeriesCore M m7-6Y75          0.689906
## Cpu_SeriesCore M M7-6Y75          0.645774
## Cpu_SeriesE-Series 6110           2.56e-13 ***
## Cpu_SeriesE-Series 7110           4.82e-12 ***
## Cpu_SeriesE-Series 9000           7.06e-08 ***
## Cpu_SeriesE-Series 9000e          3.36e-07 ***
## Cpu_SeriesE-Series E2-6110        6.72e-16 ***
## Cpu_SeriesE-Series E2-9000e       1.60e-07 ***
## Cpu_SeriesFX 8800P                0.319306
## Cpu_SeriesFX 9830P                0.698823
## Cpu_SeriesPentium Dual Core 4405Y 0.129666
## Cpu_SeriesPentium Dual Core N4200 0.045079 *
## Cpu_SeriesPentium Quad Core N3700 0.031428 *
## Cpu_SeriesPentium Quad Core N3710 6.70e-14 ***
## Cpu_SeriesPentium Quad Core N4200 5.57e-11 ***
## Cpu_SeriesRyzen 1600              0.030148 *
## Cpu_SeriesRyzen 1700              0.019233 *
## Cpu_SeriesXeon E3-1505M V6         0.051120 .
## Cpu_SeriesXeon E3-1535M v5         0.218176
## Cpu_SeriesXeon E3-1535M v6         0.204258
## Ram                               < 2e-16 ***
## Memory_1_TypeFlash Storage         1.65e-12 ***
## Memory_1_TypeHDD                  1.29e-06 ***
## Memory_1_TypeHybrid                0.043579 *
## Memory_2_Size                      0.092932 .
## OpSysAndroid                      0.126515
## OpSysChrome OS                    0.000412 ***
## OpSysLinux                        9.74e-09 ***
## OpSysMac OS X                     0.878704
## OpSysmacOS                        NA
## OpSysNo OS                        < 2e-16 ***
## OpSysWindows 10 S                 NA
## OpSysWindows 7                    0.000209 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for inverse.gaussian family taken to be 5.779728e-05)
##

```

```
## Null deviance: 0.381322 on 920 degrees of freedom
## Residual deviance: 0.043637 on 797 degrees of freedom
## AIC: 12502
##
## Number of Fisher Scoring iterations: 7
```

```
anova(modellinv, test="Chisq")
```

```
## Analysis of Deviance Table
##
## Model: inverse.gaussian, link: log
##
## Response: Price_euros
##
## Terms added sequentially (first to last)
##
##
```

	Df	Deviance	Resid. Df	Resid. Dev	Pr(>Chi)
## NULL			920	0.38132	
## Company	5	0.026867	915	0.35446	< 2.2e-16 ***
## TypeName	5	0.102395	910	0.25206	< 2.2e-16 ***
## Inches	1	0.000607	909	0.25145	0.001197 **
## ScreenResolution	10	0.088303	899	0.16315	< 2.2e-16 ***
## ScreenType	16	0.004837	883	0.15831	3.576e-11 ***
## Cpu_Series	75	0.097149	808	0.06116	< 2.2e-16 ***
## Ram	1	0.006995	807	0.05417	< 2.2e-16 ***
## Memory_1_Type	3	0.003619	804	0.05055	1.621e-13 ***
## Memory_2_Size	1	0.000196	803	0.05035	0.065326 .
## OpSys	6	0.006718	797	0.04364	< 2.2e-16 ***

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(modellinv)
```

```
## Waiting for profiling to be done...
```

	2.5 %	97.5 %
## (Intercept)	6.738320e+00	7.3227983555
## CompanyAcer	-1.562147e-01	-0.0445939292
## CompanyApple	-1.137527e+00	1.1885640031
## CompanyAsus	-7.425315e-02	0.0355135515
## CompanyHP	-2.256943e-03	0.0946929963
## CompanyLenovo	-9.465910e-02	0.0092940637
## TypeName2 in 1 Convertible	-1.198211e-02	0.2443716126
## TypeNameGaming	-1.940223e-01	0.0871481426
## TypeNameNetbook	-2.340698e-01	-0.0362687403
## TypeNameUltrabook	1.610485e-01	0.3123071133
## TypeNameWorkstation	1.465115e-01	0.5197570155
## Inches	-4.991347e-02	-0.0114853785
## ScreenResolution1366x768	-5.580363e-01	0.2550176099
## ScreenResolution1440x900	-1.305472e+00	1.1865571059
## ScreenResolution1600x900	-4.264279e-01	0.4146541867
## ScreenResolution1920x1200	-9.627248e-01	0.0805179409
## ScreenResolution2304x1440	-1.290699e+00	1.2070276640
## ScreenResolution2560x1440	-1.089113e-01	0.8120899080
## ScreenResolution2560x1600	-9.420637e-01	1.4258831575

## ScreenResolution2880x1800	-3.716441e-01	1.6595914865
## ScreenResolution3200x1800	-7.596920e-01	0.6506069713
## ScreenResolution3840x2160	2.034539e-01	2.0273382784
## ScreenType	-3.529627e-01	0.4642087924
## ScreenType4K Ultra HD	-1.992043e+00	0.0859918627
## ScreenType4K Ultra HD / Touchscreen	-1.779721e+00	0.1326775746
## ScreenTypeFull HD / Touchscreen	-9.237622e-02	0.1901796309
## ScreenTypeIPS Panel	-2.694109e-01	0.6222108900
## ScreenTypeIPS Panel 4K Ultra HD	-1.774342e+00	0.1479461074
## ScreenTypeIPS Panel 4K Ultra HD / Touchscreen	-1.725666e+00	0.1690738111
## ScreenTypeIPS Panel Full HD	8.432816e-02	0.1951368937
## ScreenTypeIPS Panel Full HD / Touchscreen	-8.864932e-02	0.1883275808
## ScreenTypeIPS Panel Quad HD+	-6.840517e-01	0.5396674445
## ScreenTypeIPS Panel Quad HD+ / Touchscreen	-8.053965e-01	0.8178044331
## ScreenTypeIPS Panel Retina Display	NA	NA
## ScreenTypeIPS Panel Touchscreen	-3.415309e-01	0.6009510456
## ScreenTypeIPS Panel Touchscreen / 4K Ultra HD	NA	NA
## ScreenTypeQuad HD+	-5.815959e-01	1.1944434857
## ScreenTypeQuad HD+ / Touchscreen	-5.080056e-01	0.9635078723
## ScreenTypeTouchscreen	-3.566272e-01	0.5001790761
## ScreenTypeTouchscreen / Full HD	-2.229223e-01	1.0447056323
## Cpu_SeriesA10-Series 9600P	-7.439260e-01	0.0170103098
## Cpu_SeriesA10-Series 9620P	-4.580747e-01	0.3049221954
## Cpu_SeriesA12-Series 9700P	-5.311022e-01	0.2636115004
## Cpu_SeriesA12-Series 9720P	-5.137999e-01	-0.0720583479
## Cpu_SeriesA4-Series 7210	-8.771718e-01	-0.2390436395
## Cpu_SeriesA6-Series 7310	-9.771331e-01	-0.4358859836
## Cpu_SeriesA6-Series 9220	-6.660850e-01	-0.4215042075
## Cpu_SeriesA6-Series A6-9220	-8.129646e-01	-0.3394086465
## Cpu_SeriesA8-Series 7410	-6.042349e-01	-0.2663756293
## Cpu_SeriesA9-Series 9410	-5.825336e-01	0.1144751039
## Cpu_SeriesA9-Series 9420	-5.541488e-01	-0.3406623480
## Cpu_SeriesA9-Series A9-9420	-6.511831e-01	-0.0866071631
## Cpu_SeriesAtom x5-Z8350	-1.170964e+00	-0.6886569857
## Cpu_SeriesAtom x5-Z8550	NA	NA
## Cpu_SeriesCeleron Dual Core 3205U	-1.358711e+00	-1.0156955013
## Cpu_SeriesCeleron Dual Core 3855U	-8.016124e-01	-0.3697978420
## Cpu_SeriesCeleron Dual Core N3050	-7.097108e-01	-0.4896640139
## Cpu_SeriesCeleron Dual Core N3060	-7.905036e-01	-0.6251033889
## Cpu_SeriesCeleron Dual Core N3350	-7.189674e-01	-0.5541424289
## Cpu_SeriesCeleron Quad Core N3160	-9.851320e-01	-0.4936000571
## Cpu_SeriesCeleron Quad Core N3450	-6.697380e-01	-0.1763544231
## Cpu_SeriesCore i3 6006U	-3.374806e-01	-0.2187455087
## Cpu_SeriesCore i3 6100U	-3.318834e-01	-0.0257263667
## Cpu_SeriesCore i3 7100U	-3.625246e-01	-0.2069766749
## Cpu_SeriesCore i3 7130U	-3.817887e-01	-0.0955424855
## Cpu_SeriesCore i5	NA	NA
## Cpu_SeriesCore i5 6200U	7.060904e-03	0.1867536869
## Cpu_SeriesCore i5 6300HQ	-6.522296e-02	0.3512939439
## Cpu_SeriesCore i5 6300U	1.123122e-01	0.5196044914
## Cpu_SeriesCore i5 6440HQ	-2.943329e-01	1.0111952130
## Cpu_SeriesCore i5 7300HQ	7.133988e-02	0.3936081934
## Cpu_SeriesCore i5 7300U	1.742943e-01	0.5078876796
## Cpu_SeriesCore i5 7440HQ	1.032448e-01	0.6108507968

## Cpu_SeriesCore i5 7500U	-4.311029e-01	0.6550527313
## Cpu_SeriesCore i5 7Y54	-5.983286e-02	0.6952877864
## Cpu_SeriesCore i5 8250U	-1.259729e-01	0.0170100715
## Cpu_SeriesCore i7	NA	NA
## Cpu_SeriesCore i7 6500U	4.896795e-03	0.2230932237
## Cpu_SeriesCore i7 6560U	-3.071303e-01	1.3930727932
## Cpu_SeriesCore i7 6600U	-4.593989e-02	0.4120997851
## Cpu_SeriesCore i7 6700HQ	1.384692e-01	0.5022092263
## Cpu_SeriesCore i7 6820HK	1.831503e-01	1.0135054564
## Cpu_SeriesCore i7 6820HQ	-6.961271e-02	0.7920576131
## Cpu_SeriesCore i7 7500U	6.709035e-02	0.2007942277
## Cpu_SeriesCore i7 7560U	-3.303964e-01	0.9271314162
## Cpu_SeriesCore i7 7600U	1.813139e-01	0.5993818313
## Cpu_SeriesCore i7 7660U	-4.102056e-01	1.4115713547
## Cpu_SeriesCore i7 7700HQ	3.113618e-01	0.5748421408
## Cpu_SeriesCore i7 7820HK	3.808688e-01	1.7965107987
## Cpu_SeriesCore i7 7820HQ	3.495327e-01	0.9961388320
## Cpu_SeriesCore i7 7Y75	-1.172937e-01	0.7553686613
## Cpu_SeriesCore i7 8550U	-2.375509e-02	0.1403786399
## Cpu_SeriesCore i7 8650U	-2.519420e-01	0.6144827331
## Cpu_SeriesCore M	-1.157925e+00	1.2416823545
## Cpu_SeriesCore M 6Y30	-8.697751e-01	-0.3599284422
## Cpu_SeriesCore M 6Y54	-1.968716e-01	1.3140995415
## Cpu_SeriesCore M 6Y75	1.846907e-01	0.9667460136
## Cpu_SeriesCore M m3	NA	NA
## Cpu_SeriesCore M M3-6Y30	-7.116803e-01	0.1640442766
## Cpu_SeriesCore M m7-6Y75	-3.330079e-01	0.8862404974
## Cpu_SeriesCore M M7-6Y75	-3.231621e-01	0.8466439625
## Cpu_SeriesE-Series 6110	-1.217806e+00	-0.6897298887
## Cpu_SeriesE-Series 7110	-8.909697e-01	-0.4899697590
## Cpu_SeriesE-Series 9000	-9.741141e-01	-0.4319669500
## Cpu_SeriesE-Series 9000e	-9.725887e-01	-0.4059176115
## Cpu_SeriesE-Series E2-6110	-1.187543e+00	-0.7194203199
## Cpu_SeriesE-Series E2-9000e	-1.019065e+00	-0.4360280607
## Cpu_SeriesFX 8800P	-6.709332e-01	0.3986368231
## Cpu_SeriesFX 9830P	-4.517832e-01	0.4354583885
## Cpu_SeriesPentium Dual Core 4405Y	-1.270178e+00	0.1331292179
## Cpu_SeriesPentium Dual Core N4200	-1.021922e+00	0.0658303133
## Cpu_SeriesPentium Quad Core N3700	-6.030281e-01	0.0224413154
## Cpu_SeriesPentium Quad Core N3710	-6.095557e-01	-0.3556264297
## Cpu_SeriesPentium Quad Core N4200	-4.642509e-01	-0.2480994607
## Cpu_SeriesRyzen 1600	1.930118e-01	1.6567928380
## Cpu_SeriesRyzen 1700	1.137132e-01	0.8935802786
## Cpu_SeriesXeon E3-1505M V6	1.325315e-01	1.8019701618
## Cpu_SeriesXeon E3-1535M v5	-9.919833e-02	NA
## Cpu_SeriesXeon E3-1535M v6	-1.050671e-01	NA
## Ram	2.479465e-02	0.0386498493
## Memory_1_TypeFlash Storage	-3.577199e-01	-0.2054591539
## Memory_1_TypeHDD	-1.450239e-01	-0.0603520249
## Memory_1_TypeHybrid	-4.488061e-01	0.0206512517
## Memory_2_Size	-1.016089e-05	0.0001169507
## OpSysAndroid	-6.078135e-01	0.0735441817
## OpSysChrome OS	9.323457e-02	0.3391934007
## OpSysLinux	-2.273950e-01	-0.1109317887

```

## OpSysMac OS X -8.666004e-01 1.2987904954
## OpSysmacOS NA NA
## OpSysNo OS -3.096570e-01 -0.1915000204
## OpSysWindows 10 S NA NA
## OpSysWindows 7 1.149885e-01 0.3600952764

model2 =step(glm(Price_euros ~ Company+TypeName+Inches+ScreenResolution+Cpu_Type+Ram+Memory_1_Size+
  Memory_1_Type+Gpu_Type+ OpSys+Company*OpSys+Company*TypeName ,
  family = Gamma(link = "log"),
  data=train),direction = "both",trace = F)
model2inv =step(glm(Price_euros ~ Company+TypeName+Inches+ScreenResolution+Cpu_Type+Ram+Memory_1_Size+
  Memory_1_Type+Gpu_Type+ OpSys+Company*OpSys+Company*TypeName ,
  family = inverse.gaussian(link = "log"),
  data=train),direction = "both",trace = F)
summary(model2)

##
## Call:
## glm(formula = Price_euros ~ Company + TypeName + Inches + ScreenResolution +
## Cpu_Type + Ram + Memory_1_Type + Gpu_Type + OpSys + Company:TypeName,
## family = Gamma(link = "log"), data = train)
##
## Deviance Residuals:
## Min 1Q Median 3Q Max
## -0.93863 -0.20720 -0.03916 0.13564 1.38454
##
## Coefficients: (8 not defined because of singularities)
## Estimate Std. Error t value Pr(>|t|)
## (Intercept) 7.1010246 0.1917742 37.028 < 2e-16
## CompanyAcer -0.2580828 0.0476975 -5.411 8.12e-08
## CompanyApple 0.1961141 0.3864554 0.507 0.611955
## CompanyAsus -0.1793403 0.0496926 -3.609 0.000325
## CompanyHP -0.0001483 0.0384669 -0.004 0.996925
## CompanyLenovo -0.1055800 0.0409681 -2.577 0.010127
## TypeName2 in 1 Convertible -0.0264620 0.0690844 -0.383 0.701786
## TypeNameGaming 0.0808790 0.0689861 1.172 0.241360
## TypeNameNetbook -0.1672070 0.2155236 -0.776 0.438068
## TypeNameUltrabook 0.1951349 0.0592371 3.294 0.001027
## TypeNameWorkstation 0.6043577 0.0988309 6.115 1.46e-09
## Inches -0.0333378 0.0128089 -2.603 0.009407
## ScreenResolution1366x768 -0.2721394 0.0302191 -9.006 < 2e-16
## ScreenResolution1440x900 0.0720439 0.4417316 0.163 0.870482
## ScreenResolution1600x900 -0.1229230 0.0797558 -1.541 0.123623
## ScreenResolution1920x1200 -0.2000294 0.2243536 -0.892 0.372865
## ScreenResolution2304x1440 -0.2358647 0.3333932 -0.707 0.479466
## ScreenResolution2560x1440 0.2857001 0.0799308 3.574 0.000370
## ScreenResolution2560x1600 -0.0324345 0.4052223 -0.080 0.936223
## ScreenResolution2880x1800 0.1896524 0.3788177 0.501 0.616750
## ScreenResolution3200x1800 0.1180568 0.0694518 1.700 0.089520
## ScreenResolution3840x2160 0.2599302 0.0610521 4.258 2.29e-05
## Cpu_TypeAMD -0.2450812 0.0579625 -4.228 2.61e-05
## Ram 0.0457834 0.0029494 15.523 < 2e-16
## Memory_1_TypeFlash Storage -0.5510247 0.0628022 -8.774 < 2e-16
## Memory_1_TypeHDD -0.1612674 0.0274878 -5.867 6.32e-09
## Memory_1_TypeHybrid -0.2403084 0.1233700 -1.948 0.051753

```

## Gpu_TypeAMD	-0.0576710	0.0396029	-1.456	0.145690
## Gpu_TypeNvidia	0.0945031	0.0324899	2.909	0.003722
## OpSysAndroid	-0.2595866	0.2916757	-0.890	0.373722
## OpSysChrome OS	-0.0380630	0.0854315	-0.446	0.656042
## OpSysLinux	-0.2094752	0.0457427	-4.579	5.34e-06
## OpSysMac OS X	0.4003659	0.2538739	1.577	0.115154
## OpSysmacOS	NA	NA	NA	NA
## OpSysNo OS	-0.3080577	0.0469916	-6.556	9.51e-11
## OpSysWindows 10 S	-0.4356126	0.2991915	-1.456	0.145764
## OpSysWindows 7	0.2788511	0.0574878	4.851	1.46e-06
## CompanyAcer:TypeName2 in 1 Convertible	0.0489957	0.1551678	0.316	0.752261
## CompanyApple:TypeName2 in 1 Convertible	NA	NA	NA	NA
## CompanyAsus:TypeName2 in 1 Convertible	0.2766254	0.1190521	2.324	0.020379
## CompanyHP:TypeName2 in 1 Convertible	0.2812396	0.1041433	2.701	0.007058
## CompanyLenovo:TypeName2 in 1 Convertible	0.2682802	0.0895976	2.994	0.002829
## CompanyAcer:TypeNameGaming	0.3713918	0.1399805	2.653	0.008120
## CompanyApple:TypeNameGaming	NA	NA	NA	NA
## CompanyAsus:TypeNameGaming	0.3338656	0.0867768	3.847	0.000128
## CompanyHP:TypeNameGaming	0.1327552	0.1156439	1.148	0.251300
## CompanyLenovo:TypeNameGaming	0.0774491	0.0908103	0.853	0.393968
## CompanyAcer:TypeNameNetbook	-0.1249357	0.2704503	-0.462	0.644230
## CompanyApple:TypeNameNetbook	NA	NA	NA	NA
## CompanyAsus:TypeNameNetbook	-0.1697901	0.2727715	-0.622	0.533801
## CompanyHP:TypeNameNetbook	0.3073592	0.2374091	1.295	0.195789
## CompanyLenovo:TypeNameNetbook	-0.1127358	0.2578026	-0.437	0.662006
## CompanyAcer:TypeNameUltrabook	-0.1522573	0.1603602	-0.949	0.342646
## CompanyApple:TypeNameUltrabook	NA	NA	NA	NA
## CompanyAsus:TypeNameUltrabook	-0.0304957	0.0982526	-0.310	0.756346
## CompanyHP:TypeNameUltrabook	0.0636532	0.0806166	0.790	0.429989
## CompanyLenovo:TypeNameUltrabook	0.2713312	0.0857000	3.166	0.001599
## CompanyAcer:TypeNameWorkstation	NA	NA	NA	NA
## CompanyApple:TypeNameWorkstation	NA	NA	NA	NA
## CompanyAsus:TypeNameWorkstation	NA	NA	NA	NA
## CompanyHP:TypeNameWorkstation	0.0179167	0.1359397	0.132	0.895174
## CompanyLenovo:TypeNameWorkstation	-0.2324637	0.1797343	-1.293	0.196226
##				
## (Intercept)	***			
## CompanyAcer	***			
## CompanyApple				
## CompanyAsus	***			
## CompanyHP				
## CompanyLenovo	*			
## TypeName2 in 1 Convertible				
## TypeNameGaming				
## TypeNameNetbook				
## TypeNameUltrabook	**			
## TypeNameWorkstation	***			
## Inches	**			
## ScreenResolution1366x768	***			
## ScreenResolution1440x900				
## ScreenResolution1600x900				
## ScreenResolution1920x1200				
## ScreenResolution2304x1440				
## ScreenResolution2560x1440	***			

```

## ScreenResolution2560x1600
## ScreenResolution2880x1800
## ScreenResolution3200x1800
## ScreenResolution3840x2160
## Cpu_TypeAMD
## Ram
## Memory_1_TypeFlash Storage
## Memory_1_TypeHDD
## Memory_1_TypeHybrid
## Gpu_TypeAMD
## Gpu_TypeNvidia
## OpSysAndroid
## OpSysChrome OS
## OpSysLinux
## OpSysMac OS X
## OpSysmacOS
## OpSysNo OS
## OpSysWindows 10 S
## OpSysWindows 7
## CompanyAcer:TypeName2 in 1 Convertible
## CompanyApple:TypeName2 in 1 Convertible
## CompanyAsus:TypeName2 in 1 Convertible
## CompanyHP:TypeName2 in 1 Convertible
## CompanyLenovo:TypeName2 in 1 Convertible
## CompanyAcer:TypeNameGaming
## CompanyApple:TypeNameGaming
## CompanyAsus:TypeNameGaming
## CompanyHP:TypeNameGaming
## CompanyLenovo:TypeNameGaming
## CompanyAcer:TypeNameNetbook
## CompanyApple:TypeNameNetbook
## CompanyAsus:TypeNameNetbook
## CompanyHP:TypeNameNetbook
## CompanyLenovo:TypeNameNetbook
## CompanyAcer:TypeNameUltrabook
## CompanyApple:TypeNameUltrabook
## CompanyAsus:TypeNameUltrabook
## CompanyHP:TypeNameUltrabook
## CompanyLenovo:TypeNameUltrabook
## CompanyAcer:TypeNameWorkstation
## CompanyApple:TypeNameWorkstation
## CompanyAsus:TypeNameWorkstation
## CompanyHP:TypeNameWorkstation
## CompanyLenovo:TypeNameWorkstation
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for Gamma family taken to be 0.08507471)
##
## Null deviance: 334.137 on 920 degrees of freedom
## Residual deviance: 67.751 on 867 degrees of freedom
## AIC: 12871
##
## Number of Fisher Scoring iterations: 6

```

```
anova(model2, test="Chisq")
```

```
## Analysis of Deviance Table
##
## Model: Gamma, link: log
##
## Response: Price_euros
##
## Terms added sequentially (first to last)
##
##
##              Df Deviance Resid. Df Resid. Dev  Pr(>Chi)
## NULL                      920      334.14
## Company           5    25.009      915    309.13 < 2.2e-16 ***
## TypeName          5   107.890      910    201.24 < 2.2e-16 ***
## Inches            1     1.095      909    200.14 0.0003328 ***
## ScreenResolution 10    70.219      899    129.92 < 2.2e-16 ***
## Cpu_Type          1     4.691      898    125.23 1.123e-13 ***
## Ram               1    31.141      897     94.09 < 2.2e-16 ***
## Memory_1_Type     3    11.773      894     82.32 < 2.2e-16 ***
## Gpu_Type           2     0.691      892     81.63 0.0172121 *
## OpSys              7     8.621      885     73.01 < 2.2e-16 ***
## Company:TypeName 18     5.255      867     67.75 1.054e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(model2)
```

```
## Waiting for profiling to be done...
```

```
##              2.5 %      97.5 %
## (Intercept)      6.72977006  7.472591648
## CompanyAcer      -0.35125350 -0.164205772
## CompanyApple     -0.54051862  0.998163613
## CompanyAsus      -0.27602585 -0.081650768
## CompanyHP        -0.07530280  0.074921749
## CompanyLenovo    -0.18557826 -0.025560053
## TypeName2 in 1 Convertible -0.16106670  0.111373397
## TypeNameGaming   -0.05332005  0.217237661
## TypeNameNetbook  -0.56430676  0.280480295
## TypeNameUltrabook  0.07916220  0.312516840
## TypeNameWorkstation 0.41428831  0.803804197
## Inches          -0.05812959 -0.008541376
## ScreenResolution1366x768 -0.33172120 -0.212460554
## ScreenResolution1440x900 -0.82437425  0.929696413
## ScreenResolution1600x900 -0.27650079  0.036294812
## ScreenResolution1920x1200 -0.62084608  0.266263457
## ScreenResolution2304x1440 -0.93330553  0.383492996
## ScreenResolution2560x1440  0.13341203  0.443703904
## ScreenResolution2560x1600 -0.86671247  0.744328262
## ScreenResolution2880x1800 -0.59175533  0.923275225
## ScreenResolution3200x1800 -0.01619843  0.256599451
## ScreenResolution3840x2160  0.14244299  0.380479414
## Cpu_TypeAMD      -0.35882919 -0.130566819
## Ram              0.03979626  0.051832669
```



```
## Memory_1_TypeFlash Storage -0.67730863 -0.422041053
## Memory_1_TypeHDD -0.21591316 -0.106504781
## Memory_1_TypeHybrid -0.47402280 0.010319329
## Gpu_TypeAMD -0.13538311 0.020733164
## Gpu_TypeNvidia 0.03060362 0.158665038
## OpSysAndroid -0.83517891 0.316005770
## OpSysChrome OS -0.21286907 0.139064820
## OpSysLinux -0.29897632 -0.118425063
## OpSysMac OS X -0.11508624 0.907320915
## OpSysmacOS NA NA
## OpSysNo OS -0.39987510 -0.214715274
## OpSysWindows 10 S -0.97484012 0.208113994
## OpSysWindows 7 0.16723977 0.393507950
## CompanyAcer:TypeName2 in 1 Convertible -0.25026658 0.362876550
## CompanyApple:TypeName2 in 1 Convertible NA NA
## CompanyAsus:TypeName2 in 1 Convertible 0.04297012 0.514393756
## CompanyHP:TypeName2 in 1 Convertible 0.07795239 0.486424566
## CompanyLenovo:TypeName2 in 1 Convertible 0.09163741 0.444033637
## CompanyAcer:TypeNameGaming 0.10302484 0.652297978
## CompanyApple:TypeNameGaming NA NA
## CompanyAsus:TypeNameGaming 0.16305503 0.503476422
## CompanyHP:TypeNameGaming -0.09138834 0.363005953
## CompanyLenovo:TypeNameGaming -0.10038938 0.255878928
## CompanyAcer:TypeNameNetbook -0.66802920 0.400430661
## CompanyApple:TypeNameNetbook NA NA
## CompanyAsus:TypeNameNetbook -0.71606857 0.358989835
## CompanyHP:TypeNameNetbook -0.17765830 0.753235647
## CompanyLenovo:TypeNameNetbook -0.63305125 0.381104222
## CompanyAcer:TypeNameUltrabook -0.45625615 0.174029001
## CompanyApple:TypeNameUltrabook NA NA
## CompanyAsus:TypeNameUltrabook -0.22218821 0.163675219
## CompanyHP:TypeNameUltrabook -0.09456186 0.222718767
## CompanyLenovo:TypeNameUltrabook 0.10449014 0.439278007
## CompanyAcer:TypeNameWorkstation NA NA
## CompanyApple:TypeNameWorkstation NA NA
## CompanyAsus:TypeNameWorkstation NA NA
## CompanyHP:TypeNameWorkstation -0.25052940 0.285585442
## CompanyLenovo:TypeNameWorkstation -0.57816582 0.128348196
```

```
summary(model2inv)
```

```
##
## Call:
## glm(formula = Price_euros ~ Company + TypeName + Inches + ScreenResolution +
##      Cpu_Type + Ram + Memory_1_Type + Gpu_Type + OpSys + Company:OpSys +
##      Company:TypeName, family = inverse.gaussian(link = "log"),
##      data = train)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -0.047099 -0.006973 -0.001730  0.003622  0.041251
##
## Coefficients: (38 not defined because of singularities)
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    7.240570   0.205288  35.270 < 2e-16
```

## CompanyAcer	-0.194988	0.045976	-4.241	2.47e-05
## CompanyApple	0.157427	0.468652	0.336	0.737017
## CompanyAsus	-0.134991	0.048164	-2.803	0.005182
## CompanyHP	0.031333	0.039061	0.802	0.422685
## CompanyLenovo	-0.113281	0.040855	-2.773	0.005679
## TypeName2 in 1 Convertible	-0.055342	0.075605	-0.732	0.464373
## TypeNameGaming	0.019667	0.088884	0.221	0.824940
## TypeNameNetbook	-0.033943	0.279983	-0.121	0.903536
## TypeNameUltrabook	0.169499	0.071556	2.369	0.018069
## TypeNameWorkstation	0.706170	0.155902	4.530	6.75e-06
## Inches	-0.052403	0.013500	-3.882	0.000112
## ScreenResolution1366x768	-0.229518	0.027455	-8.360	2.52e-16
## ScreenResolution1440x900	0.231517	0.520988	0.444	0.656879
## ScreenResolution1600x900	-0.077856	0.069206	-1.125	0.260910
## ScreenResolution1920x1200	-0.098022	0.190434	-0.515	0.606876
## ScreenResolution2304x1440	-0.233836	0.366877	-0.637	0.524055
## ScreenResolution2560x1440	0.304698	0.130243	2.339	0.019541
## ScreenResolution2560x1600	0.026567	0.498211	0.053	0.957486
## ScreenResolution2880x1800	0.133186	0.482957	0.276	0.782790
## ScreenResolution3200x1800	0.143115	0.094246	1.519	0.129249
## ScreenResolution3840x2160	0.245355	0.095454	2.570	0.010326
## Cpu_TypeAMD	-0.267421	0.050398	-5.306	1.43e-07
## Ram	0.060701	0.004031	15.060	< 2e-16
## Memory_1_TypeFlash Storage	-0.651497	0.047937	-13.591	< 2e-16
## Memory_1_TypeHDD	-0.141312	0.026323	-5.368	1.02e-07
## Memory_1_TypeHybrid	-0.177358	0.118105	-1.502	0.133545
## Gpu_TypeAMD	-0.028164	0.038791	-0.726	0.468014
## Gpu_TypeNvidia	0.118281	0.033236	3.559	0.000393
## OpSysAndroid	-0.259587	0.224080	-1.158	0.247002
## OpSysChrome OS	-0.273569	0.327094	-0.836	0.403185
## OpSysLinux	-0.154684	0.054167	-2.856	0.004398
## OpSysMac OS X	0.544478	0.346490	1.571	0.116456
## OpSysmacOS	NA	NA	NA	NA
## OpSysNo OS	-0.264437	0.046770	-5.654	2.14e-08
## OpSysWindows 10 S	-0.462055	0.176444	-2.619	0.008982
## OpSysWindows 7	0.284891	0.143621	1.984	0.047616
## CompanyAcer:OpSysAndroid	NA	NA	NA	NA
## CompanyApple:OpSysAndroid	NA	NA	NA	NA
## CompanyAsus:OpSysAndroid	NA	NA	NA	NA
## CompanyHP:OpSysAndroid	NA	NA	NA	NA
## CompanyLenovo:OpSysAndroid	NA	NA	NA	NA
## CompanyAcer:OpSysChrome OS	0.327693	0.333573	0.982	0.326193
## CompanyApple:OpSysChrome OS	NA	NA	NA	NA
## CompanyAsus:OpSysChrome OS	0.623606	0.358597	1.739	0.082391
## CompanyHP:OpSysChrome OS	0.304603	0.361135	0.843	0.399206
## CompanyLenovo:OpSysChrome OS	0.103014	0.352882	0.292	0.770418
## CompanyAcer:OpSysLinux	-0.094406	0.088943	-1.061	0.288800
## CompanyApple:OpSysLinux	NA	NA	NA	NA
## CompanyAsus:OpSysLinux	-0.229854	0.092791	-2.477	0.013437
## CompanyHP:OpSysLinux	NA	NA	NA	NA
## CompanyLenovo:OpSysLinux	NA	NA	NA	NA
## CompanyAcer:OpSysMac OS X	NA	NA	NA	NA
## CompanyApple:OpSysMac OS X	NA	NA	NA	NA
## CompanyAsus:OpSysMac OS X	NA	NA	NA	NA

## CompanyHP:OpSysMac OS X	NA	NA	NA	NA
## CompanyLenovo:OpSysMac OS X	NA	NA	NA	NA
## CompanyAcer:OpSysmacOS	NA	NA	NA	NA
## CompanyApple:OpSysmacOS	NA	NA	NA	NA
## CompanyAsus:OpSysmacOS	NA	NA	NA	NA
## CompanyHP:OpSysmacOS	NA	NA	NA	NA
## CompanyLenovo:OpSysmacOS	NA	NA	NA	NA
## CompanyAcer:OpSysNo OS	NA	NA	NA	NA
## CompanyApple:OpSysNo OS	NA	NA	NA	NA
## CompanyAsus:OpSysNo OS	0.227737	0.160463	1.419	0.156190
## CompanyHP:OpSysNo OS	-0.177460	0.085065	-2.086	0.037258
## CompanyLenovo:OpSysNo OS	NA	NA	NA	NA
## CompanyAcer:OpSysWindows 10 S	NA	NA	NA	NA
## CompanyApple:OpSysWindows 10 S	NA	NA	NA	NA
## CompanyAsus:OpSysWindows 10 S	NA	NA	NA	NA
## CompanyHP:OpSysWindows 10 S	NA	NA	NA	NA
## CompanyLenovo:OpSysWindows 10 S	NA	NA	NA	NA
## CompanyAcer:OpSysWindows 7	NA	NA	NA	NA
## CompanyApple:OpSysWindows 7	NA	NA	NA	NA
## CompanyAsus:OpSysWindows 7	NA	NA	NA	NA
## CompanyHP:OpSysWindows 7	0.108808	0.175298	0.621	0.534960
## CompanyLenovo:OpSysWindows 7	-0.151066	0.218732	-0.691	0.489977
## CompanyAcer:TypeName2 in 1 Convertible	0.055646	0.132918	0.419	0.675577
## CompanyApple:TypeName2 in 1 Convertible	NA	NA	NA	NA
## CompanyAsus:TypeName2 in 1 Convertible	0.169119	0.120795	1.400	0.161859
## CompanyHP:TypeName2 in 1 Convertible	0.289494	0.124635	2.323	0.020427
## CompanyLenovo:TypeName2 in 1 Convertible	0.296667	0.102957	2.881	0.004057
## CompanyAcer:TypeNameGaming	0.309637	0.182616	1.696	0.090331
## CompanyApple:TypeNameGaming	NA	NA	NA	NA
## CompanyAsus:TypeNameGaming	0.364513	0.109899	3.317	0.000949
## CompanyHP:TypeNameGaming	0.164921	0.151317	1.090	0.276062
## CompanyLenovo:TypeNameGaming	0.127153	0.113484	1.120	0.262838
## CompanyAcer:TypeNameNetbook	-0.219748	0.298022	-0.737	0.461107
## CompanyApple:TypeNameNetbook	NA	NA	NA	NA
## CompanyAsus:TypeNameNetbook	-0.360724	0.296115	-1.218	0.223487
## CompanyHP:TypeNameNetbook	-0.113864	0.290702	-0.392	0.695389
## CompanyLenovo:TypeNameNetbook	-0.357249	0.302727	-1.180	0.238286
## CompanyAcer:TypeNameUltrabook	-0.186058	0.167708	-1.109	0.267563
## CompanyApple:TypeNameUltrabook	NA	NA	NA	NA
## CompanyAsus:TypeNameUltrabook	-0.088741	0.114590	-0.774	0.438894
## CompanyHP:TypeNameUltrabook	0.059419	0.100972	0.588	0.556374
## CompanyLenovo:TypeNameUltrabook	0.449797	0.114902	3.915	9.77e-05
## CompanyAcer:TypeNameWorkstation	NA	NA	NA	NA
## CompanyApple:TypeNameWorkstation	NA	NA	NA	NA
## CompanyAsus:TypeNameWorkstation	NA	NA	NA	NA
## CompanyHP:TypeNameWorkstation	-0.132594	0.215479	-0.615	0.538489
## CompanyLenovo:TypeNameWorkstation	-0.295485	0.295868	-0.999	0.318219
##				
## (Intercept)	***			
## CompanyAcer	***			
## CompanyApple				
## CompanyAsus	**			
## CompanyHP				
## CompanyLenovo	**			

```

## TypeName2 in 1 Convertible
## TypeNameGaming
## TypeNameNetbook
## TypeNameUltrabook *
## TypeNameWorkstation ***
## Inches ***
## ScreenResolution1366x768 ***
## ScreenResolution1440x900
## ScreenResolution1600x900
## ScreenResolution1920x1200
## ScreenResolution2304x1440
## ScreenResolution2560x1440 *
## ScreenResolution2560x1600
## ScreenResolution2880x1800
## ScreenResolution3200x1800
## ScreenResolution3840x2160 *
## Cpu_TypeAMD ***
## Ram ***
## Memory_1_TypeFlash Storage ***
## Memory_1_TypeHDD ***
## Memory_1_TypeHybrid
## Gpu_TypeAMD
## Gpu_TypeNvidia ***
## OpSysAndroid
## OpSysChrome OS
## OpSysLinux **
## OpSysMac OS X
## OpSysmacOS
## OpSysNo OS ***
## OpSysWindows 10 S **
## OpSysWindows 7 *
## CompanyAcer:OpSysAndroid
## CompanyApple:OpSysAndroid
## CompanyAsus:OpSysAndroid
## CompanyHP:OpSysAndroid
## CompanyLenovo:OpSysAndroid
## CompanyAcer:OpSysChrome OS
## CompanyApple:OpSysChrome OS
## CompanyAsus:OpSysChrome OS .
## CompanyHP:OpSysChrome OS
## CompanyLenovo:OpSysChrome OS
## CompanyAcer:OpSysLinux
## CompanyApple:OpSysLinux
## CompanyAsus:OpSysLinux *
## CompanyHP:OpSysLinux
## CompanyLenovo:OpSysLinux
## CompanyAcer:OpSysMac OS X
## CompanyApple:OpSysMac OS X
## CompanyAsus:OpSysMac OS X
## CompanyHP:OpSysMac OS X
## CompanyLenovo:OpSysMac OS X
## CompanyAcer:OpSysmacOS
## CompanyApple:OpSysmacOS
## CompanyAsus:OpSysmacOS

```

```

## CompanyHP:OpSysmacOS
## CompanyLenovo:OpSysmacOS
## CompanyAcer:OpSysNo OS
## CompanyApple:OpSysNo OS
## CompanyAsus:OpSysNo OS
## CompanyHP:OpSysNo OS *
## CompanyLenovo:OpSysNo OS
## CompanyAcer:OpSysWindows 10 S
## CompanyApple:OpSysWindows 10 S
## CompanyAsus:OpSysWindows 10 S
## CompanyHP:OpSysWindows 10 S
## CompanyLenovo:OpSysWindows 10 S
## CompanyAcer:OpSysWindows 7
## CompanyApple:OpSysWindows 7
## CompanyAsus:OpSysWindows 7
## CompanyHP:OpSysWindows 7
## CompanyLenovo:OpSysWindows 7
## CompanyAcer:TypeName2 in 1 Convertible
## CompanyApple:TypeName2 in 1 Convertible
## CompanyAsus:TypeName2 in 1 Convertible
## CompanyHP:TypeName2 in 1 Convertible *
## CompanyLenovo:TypeName2 in 1 Convertible **
## CompanyAcer:TypeNameGaming .
## CompanyApple:TypeNameGaming
## CompanyAsus:TypeNameGaming ***
## CompanyHP:TypeNameGaming
## CompanyLenovo:TypeNameGaming
## CompanyAcer:TypeNameNetbook
## CompanyApple:TypeNameNetbook
## CompanyAsus:TypeNameNetbook
## CompanyHP:TypeNameNetbook
## CompanyLenovo:TypeNameNetbook
## CompanyAcer:TypeNameUltrabook
## CompanyApple:TypeNameUltrabook
## CompanyAsus:TypeNameUltrabook
## CompanyHP:TypeNameUltrabook
## CompanyLenovo:TypeNameUltrabook ***
## CompanyAcer:TypeNameWorkstation
## CompanyApple:TypeNameWorkstation
## CompanyAsus:TypeNameWorkstation
## CompanyHP:TypeNameWorkstation
## CompanyLenovo:TypeNameWorkstation
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for inverse.gaussian family taken to be 0.000100763)
##
## Null deviance: 0.381322 on 920 degrees of freedom
## Residual deviance: 0.081343 on 857 degrees of freedom
## AIC: 12956
##
## Number of Fisher Scoring iterations: 10

```

```
anova(model2inv, test="Chisq")
```

```
## Analysis of Deviance Table
##
## Model: inverse.gaussian, link: log
##
## Response: Price_euros
##
## Terms added sequentially (first to last)
##
##
##              Df Deviance Resid. Df Resid. Dev  Pr(>Chi)
## NULL                      920    0.38132
## Company                5 0.026867      915    0.35446 < 2.2e-16 ***
## TypeName                5 0.102395      910    0.25206 < 2.2e-16 ***
## Inches                  1 0.000607      909    0.25145  0.014147 *
## ScreenResolution       10 0.088303      899    0.16315 < 2.2e-16 ***
## Cpu_Type                1 0.004803      898    0.15835 5.063e-12 ***
## Ram                    1 0.035721      897    0.12263 < 2.2e-16 ***
## Memory_1_Type          3 0.019833      894    0.10279 < 2.2e-16 ***
## Gpu_Type                2 0.001110      892    0.10168  0.004049 **
## OpSys                   7 0.011946      885    0.08974 < 2.2e-16 ***
## Company:OpSys          10 0.002655      875    0.08708  0.003303 **
## Company:TypeName       18 0.005740      857    0.08134 6.279e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(model2inv)
```

```
## Waiting for profiling to be done...
```

```
##              2.5 %      97.5 %
## (Intercept)      6.84836543  7.634696106
## CompanyAcer      -0.28523032 -0.103722830
## CompanyApple     -0.70471098  1.288582111
## CompanyAsus      -0.22903662 -0.039248303
## CompanyHP        -0.04437510  0.106617486
## CompanyLenovo    -0.19325585 -0.033579469
## TypeName2 in 1 Convertible -0.19931829  0.101652186
## TypeNameGaming   -0.14754763  0.203064071
## TypeNameNetbook  -0.48061363  0.740695953
## TypeNameUltrabook  0.03268418  0.315458261
## TypeNameWorkstation 0.43092353  1.067364307
## Inches          -0.07823817 -0.026617355
## ScreenResolution1366x768 -0.28540929 -0.173798593
## ScreenResolution1440x900 -0.96017234  1.241627780
## ScreenResolution1600x900 -0.20823613  0.063951493
## ScreenResolution1920x1200 -0.44197802  0.334139933
## ScreenResolution2304x1440 -1.21684761  0.433148539
## ScreenResolution2560x1440  0.07125218  0.592876343
## ScreenResolution2560x1600 -1.13869579  0.965514618
## ScreenResolution2880x1800 -0.97009350  1.215264891
## ScreenResolution3200x1800 -0.03416463  0.346250154
## ScreenResolution3840x2160  0.07195775  0.446692214
## Cpu_TypeAMD      -0.36771832 -0.167050754
```

## Ram	0.05186120	0.069873279
## Memory_1_TypeFlash Storage	-0.75384580	-0.546378449
## Memory_1_TypeHDD	-0.19491156	-0.087890186
## Memory_1_TypeHybrid	-0.39195849	0.081060525
## Gpu_TypeAMD	-0.10447164	0.050238714
## Gpu_TypeNvidia	0.05308156	0.184513576
## OpSysAndroid	-0.73169501	0.184941620
## OpSysChrome OS	-1.09295983	0.331385442
## OpSysLinux	-0.26039975	-0.043983544
## OpSysMac OS X	-0.28717018	1.224628183
## OpSysmacOS	NA	NA
## OpSysNo OS	-0.35590622	-0.170158985
## OpSysWindows 10 S	-0.76882365	-0.052374858
## OpSysWindows 7	0.03357880	0.611658149
## CompanyAcer:OpSysAndroid	NA	NA
## CompanyApple:OpSysAndroid	NA	NA
## CompanyAsus:OpSysAndroid	NA	NA
## CompanyHP:OpSysAndroid	NA	NA
## CompanyLenovo:OpSysAndroid	NA	NA
## CompanyAcer:OpSysChrome OS	-0.28780326	1.152952555
## CompanyApple:OpSysChrome OS	NA	NA
## CompanyAsus:OpSysChrome OS	-0.04054972	1.479719775
## CompanyHP:OpSysChrome OS	-0.36354237	1.164117901
## CompanyLenovo:OpSysChrome OS	-0.54372059	0.948567440
## CompanyAcer:OpSysLinux	-0.26815769	0.083740450
## CompanyApple:OpSysLinux	NA	NA
## CompanyAsus:OpSysLinux	-0.41112926	-0.042498231
## CompanyHP:OpSysLinux	NA	NA
## CompanyLenovo:OpSysLinux	NA	NA
## CompanyAcer:OpSysMac OS X	NA	NA
## CompanyApple:OpSysMac OS X	NA	NA
## CompanyAsus:OpSysMac OS X	NA	NA
## CompanyHP:OpSysMac OS X	NA	NA
## CompanyLenovo:OpSysMac OS X	NA	NA
## CompanyAcer:OpSysmacOS	NA	NA
## CompanyApple:OpSysmacOS	NA	NA
## CompanyAsus:OpSysmacOS	NA	NA
## CompanyHP:OpSysmacOS	NA	NA
## CompanyLenovo:OpSysmacOS	NA	NA
## CompanyAcer:OpSysNo OS	NA	NA
## CompanyApple:OpSysNo OS	NA	NA
## CompanyAsus:OpSysNo OS	-0.05696392	0.591355502
## CompanyHP:OpSysNo OS	-0.33979895	-0.006204891
## CompanyLenovo:OpSysNo OS	NA	NA
## CompanyAcer:OpSysWindows 10 S	NA	NA
## CompanyApple:OpSysWindows 10 S	NA	NA
## CompanyAsus:OpSysWindows 10 S	NA	NA
## CompanyHP:OpSysWindows 10 S	NA	NA
## CompanyLenovo:OpSysWindows 10 S	NA	NA
## CompanyAcer:OpSysWindows 7	NA	NA
## CompanyApple:OpSysWindows 7	NA	NA
## CompanyAsus:OpSysWindows 7	NA	NA
## CompanyHP:OpSysWindows 7	-0.26367138	0.440254278
## CompanyLenovo:OpSysWindows 7	-0.58492358	0.301092212

## CompanyAcer:TypeName2 in 1 Convertible	-0.20399359	0.332294229
## CompanyApple:TypeName2 in 1 Convertible	NA	NA
## CompanyAsus:TypeName2 in 1 Convertible	-0.07016316	0.418506369
## CompanyHP:TypeName2 in 1 Convertible	0.04970689	0.542573798
## CompanyLenovo:TypeName2 in 1 Convertible	0.09113445	0.502169995
## CompanyAcer:TypeNameGaming	-0.02150874	0.716157874
## CompanyApple:TypeNameGaming	NA	NA
## CompanyAsus:TypeNameGaming	0.14391249	0.578420679
## CompanyHP:TypeNameGaming	-0.12060398	0.483802099
## CompanyLenovo:TypeNameGaming	-0.09790326	0.350586620
## CompanyAcer:TypeNameNetbook	-1.01245107	0.284454397
## CompanyApple:TypeNameNetbook	NA	NA
## CompanyAsus:TypeNameNetbook	-1.15049177	0.132997977
## CompanyHP:TypeNameNetbook	-0.89817973	0.363802076
## CompanyLenovo:TypeNameNetbook	-1.15070980	0.152482311
## CompanyAcer:TypeNameUltrabook	-0.48852250	0.186832789
## CompanyApple:TypeNameUltrabook	NA	NA
## CompanyAsus:TypeNameUltrabook	-0.30967029	0.143908577
## CompanyHP:TypeNameUltrabook	-0.13784783	0.261908893
## CompanyLenovo:TypeNameUltrabook	0.22798742	0.686514234
## CompanyAcer:TypeNameWorkstation	NA	NA
## CompanyApple:TypeNameWorkstation	NA	NA
## CompanyAsus:TypeNameWorkstation	NA	NA
## CompanyHP:TypeNameWorkstation	-0.57501538	0.301822827
## CompanyLenovo:TypeNameWorkstation	-0.83702356	0.415861515

Predict

```
y_hat <- exp(predict(modellinv, train))
```

```
## Warning in stats::predict.lm(object, ...): prediction from a rank-deficient fit
## may be misleading
```

```
mape(train$Price_euros,y_hat)
```

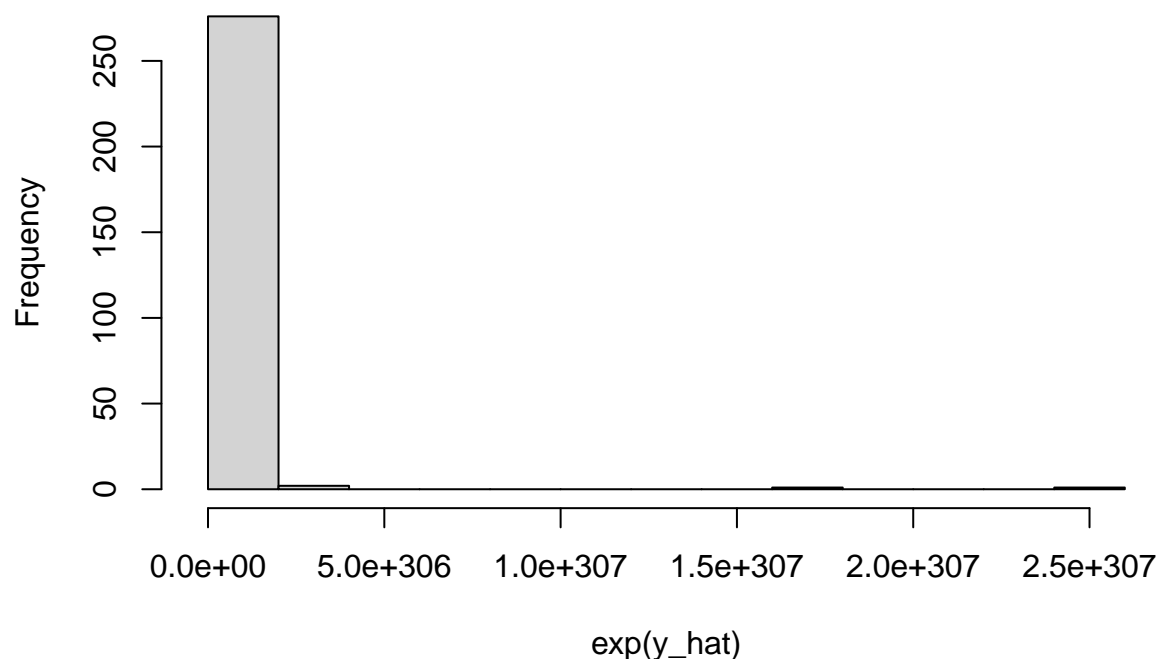
```
## [1] 0.1655652
```

```
mean(abs((train$Price_euros-y_hat)/y_hat)) * 100
```

```
## [1] 16.00653
```

```
hist(exp(y_hat))
```


Histogram of exp(y_hat)



```
residual <- data.frame(1:nrow(train),model1$residuals, model1inv$residuals, model2$residuals, model2inv$residuals)
residual
```

##	X1.nrow.train.	model1.residuals	model1inv.residuals	model2.residuals
## 1	1	-7.842863e-02	-1.523053e-01	-4.786793e-02
## 2	2	1.129529e-01	1.333166e-01	7.850928e-02
## 3	3	-8.740525e-02	-1.012211e-01	-2.100495e-01
## 4	4	-2.968490e-01	-2.097762e-01	-1.828914e-01
## 5	5	-2.889644e-02	9.460804e-03	-1.709718e-01
## 6	6	-2.916154e-01	-3.190414e-01	-2.524597e-01
## 7	7	1.977327e-02	-5.959170e-03	-1.273992e-01
## 8	8	2.850916e-14	7.497244e-02	1.031341e-01
## 9	9	-1.416184e-01	1.232499e-01	-5.063224e-02
## 10	10	1.959035e-01	2.794488e-01	4.772777e-01
## 11	11	1.232862e-01	1.511907e-01	5.535562e-02
## 12	12	6.021038e-02	-5.823622e-02	3.153961e-01
## 13	13	-1.727310e-01	-1.105464e-01	2.557497e-01
## 14	14	6.506604e-03	-8.240472e-03	5.861989e-02
## 15	15	1.114032e-01	1.089701e-01	6.503006e-03
## 16	16	-2.191190e-02	-4.445173e-02	-2.685995e-01
## 17	17	-2.649770e-01	-2.649770e-01	-2.649770e-01
## 18	18	1.384939e-14	-2.846370e-02	1.980340e-02
## 19	19	-1.630793e-01	-2.115329e-01	-3.416384e-01
## 20	20	-9.403827e-02	-1.577877e-01	-2.643384e-01
## 21	21	1.036320e-01	-1.090919e-01	4.616163e-02
## 22	22	-1.048663e-01	-1.271250e-01	-1.328456e-01
## 23	23	-2.247044e-01	-2.973243e-01	-4.050870e-01

## 24	24	-1.541596e-01	-9.602915e-02	-2.104917e-01
## 25	25	1.672976e-02	-1.254419e-01	6.240769e-03
## 26	26	5.704286e-01	5.235310e-01	8.471715e-01
## 27	27	7.355990e-02	1.028900e-02	3.963340e-01
## 28	28	-2.047879e-01	-2.216931e-01	-3.475937e-01
## 29	29	3.471267e-01	4.561119e-01	4.699637e-01
## 30	30	3.123025e-02	8.744892e-02	2.609260e-01
## 31	31	-5.728490e-02	-6.682514e-02	3.544543e-02
## 32	32	1.514031e-01	1.887315e-02	-1.633714e-02
## 33	33	-1.338906e-01	-1.816477e-02	-1.449827e-01
## 34	34	4.998887e-02	-8.499434e-02	4.166286e-02
## 35	35	-2.370564e-01	-1.919236e-01	-3.538745e-01
## 36	36	7.966463e-03	-5.752938e-02	-1.477701e-01
## 37	37	2.131983e-01	2.248443e-01	2.119162e-01
## 38	38	-4.460386e-02	-1.802839e-02	2.663557e-01
## 39	39	2.054899e-01	1.804933e-01	-9.491463e-02
## 40	40	8.409113e-03	2.644039e-03	-4.280432e-02
## 41	41	2.248520e-14	2.941988e-15	-8.561448e-02
## 42	42	8.722213e-02	-7.447380e-02	-3.383223e-01
## 43	43	1.285168e-01	6.123086e-02	2.314200e-01
## 44	44	2.252357e-01	2.217274e-02	-1.019763e-01
## 45	45	-2.361895e-02	-4.493922e-02	1.819833e-01
## 46	46	4.062660e-01	3.079076e-01	5.996721e-01
## 47	47	9.073708e-02	9.854746e-02	1.008768e-01
## 48	48	9.049604e-02	3.891035e-02	-5.788693e-03
## 49	49	-7.202205e-02	-5.994340e-02	-1.390850e-02
## 50	50	1.124617e-01	1.813711e-01	1.982132e-02
## 51	51	1.842410e-02	-1.613732e-02	2.560194e-01
## 52	52	-1.264319e-01	-6.526018e-02	-2.055035e-01
## 53	53	-5.816096e-02	-1.067030e-01	-9.683354e-02
## 54	54	-1.671217e-01	-1.733159e-01	5.610866e-02
## 55	55	7.810108e-02	4.182728e-03	-2.777198e-01
## 56	56	-1.863301e-01	-1.031595e-01	1.534269e-01
## 57	57	-6.812344e-02	6.533278e-02	-2.824470e-01
## 58	58	1.829295e-02	-1.166524e-02	6.459872e-02
## 59	59	-6.656128e-03	-9.023835e-02	-8.933336e-02
## 60	60	1.445021e-01	1.646368e-01	-1.945678e-01
## 61	61	-6.730581e-02	-9.641975e-02	-4.603915e-01
## 62	62	1.710189e-14	1.628751e-16	-3.590792e-01
## 63	63	-9.357656e-02	-2.176893e-01	-3.455939e-01
## 64	64	3.029061e-01	3.459182e-01	3.279704e-01
## 65	65	-2.944075e-02	-1.535391e-02	-1.030218e-01
## 66	66	-4.635068e-03	1.017793e-01	-4.398869e-02
## 67	67	-2.008911e-01	-2.769824e-01	-2.413142e-01
## 68	68	-3.467301e-02	-1.134372e-01	-1.625874e-01
## 69	69	-1.166546e-01	-8.701332e-02	-3.229236e-01
## 70	70	1.318998e-01	9.905318e-02	3.237116e-01
## 71	71	2.028575e-02	-1.651668e-02	-3.203574e-01
## 72	72	1.912185e-14	1.485192e-15	2.237361e-01
## 73	73	4.800074e-02	2.948026e-02	-3.479611e-02
## 74	74	-1.132203e-02	1.767435e-01	6.504068e-01
## 75	75	4.773838e-01	3.599230e-01	2.166090e-01
## 76	76	-1.291966e-02	5.773422e-02	-1.298395e-01
## 77	77	-2.688908e-01	-2.131200e-01	-5.148909e-02

## 78	78	6.179943e-03	-1.233500e-01	-1.923058e-01
## 79	79	-5.170733e-02	4.043662e-02	-1.466817e-01
## 80	80	-3.405508e-01	-3.024344e-01	-5.898718e-02
## 81	81	-2.225860e-01	-1.714030e-01	6.293540e-02
## 82	82	4.713192e-01	5.167836e-01	5.049090e-01
## 83	83	6.257697e-02	-5.559757e-02	-5.559757e-02
## 84	84	1.386670e-01	1.594307e-01	2.063090e-01
## 85	85	1.674096e-01	1.329999e-01	-2.603510e-01
## 86	86	-2.817088e-01	-2.693178e-01	-1.993565e-01
## 87	87	-2.428955e-01	-3.297725e-01	-9.005802e-04
## 88	88	-9.317770e-02	-8.018641e-02	1.557866e-01
## 89	89	-7.039125e-02	-2.680922e-01	2.675610e-02
## 90	90	-1.818020e-01	-9.890882e-02	-1.664243e-01
## 91	91	8.154476e-02	-1.875883e-02	1.104508e-02
## 92	92	-2.287343e-01	-2.173392e-01	-2.436008e-01
## 93	93	2.120907e-14	2.495184e-15	-3.413249e-01
## 94	94	1.488077e-01	1.008224e-01	-6.352395e-02
## 95	95	-3.099897e-01	-3.390128e-01	-2.980892e-01
## 96	96	-2.693612e-01	-2.827052e-01	-4.813885e-01
## 97	97	2.855993e-01	3.943882e-01	7.322732e-01
## 98	98	-3.771813e-03	8.441120e-03	-9.681786e-02
## 99	99	1.653792e-01	9.085005e-02	2.428302e-01
## 100	100	1.017561e-01	3.538915e-01	3.810628e-01
## 101	101	-2.284649e-01	-2.121006e-01	-3.050494e-01
## 102	102	2.209432e-14	2.473245e-15	1.013029e-02
## 103	103	3.941698e-01	2.216973e-01	3.491346e-01
## 104	104	2.072929e-01	1.069760e-01	2.942762e-02
## 105	105	8.487915e-01	8.824591e-01	1.066671e+00
## 106	106	-1.461448e-01	-1.168841e-01	1.642727e-02
## 107	107	3.117776e-01	2.701308e-01	-1.707484e-01
## 108	108	2.279841e-01	2.856074e-01	7.361065e-01
## 109	109	3.611528e-02	5.334521e-02	2.324922e-01
## 110	110	-6.434166e-02	-8.864839e-02	-1.140180e-01
## 111	111	2.380185e-01	2.485193e-01	2.559300e-01
## 112	112	1.160750e-01	8.005146e-02	-1.335431e-01
## 113	113	-1.225673e-01	-1.696517e-01	-3.827479e-02
## 114	114	-6.416039e-02	-1.212746e-01	3.876599e-01
## 115	115	-1.356686e-01	1.253268e-02	7.321704e-02
## 116	116	7.542338e-02	3.597438e-02	-3.513300e-01
## 117	117	-1.971922e-01	-1.486666e-01	-1.595459e-01
## 118	118	-4.382750e-02	8.292485e-03	-1.909802e-01
## 119	119	-1.242950e-01	-8.173880e-02	1.751485e-01
## 120	120	-1.331558e-01	-7.792011e-03	1.744138e-01
## 121	121	4.139930e-01	4.593007e-01	9.401643e-01
## 122	122	8.216904e-02	-7.055189e-02	-1.070055e-01
## 123	123	-4.962563e-02	-1.918698e-02	1.134061e-01
## 124	124	-3.237619e-01	-2.887574e-01	-1.361752e-01
## 125	125	-1.150654e-01	-1.003615e-01	-3.580705e-01
## 126	126	-8.042837e-02	-1.384554e-01	-5.948182e-02
## 127	127	-1.512157e-01	-1.280201e-01	-9.896805e-02
## 128	128	8.037060e-02	-1.016200e-01	1.558839e-01
## 129	129	2.162823e-14	3.881990e-15	5.341306e-02
## 130	130	5.481712e-02	-7.851574e-02	-1.311462e-01
## 131	131	2.885244e-01	3.394085e-01	-5.329312e-04

## 132	132	2.453929e-14	4.149155e-15	2.548766e-14
## 133	133	-6.006043e-02	-9.243143e-02	1.060784e-01
## 134	134	2.228215e-01	1.063694e-01	2.079078e-01
## 135	135	-6.727552e-02	-1.208515e-02	-1.067264e-01
## 136	136	6.126637e-01	6.049542e-01	4.003187e-01
## 137	137	3.448245e-01	2.229134e-01	1.932576e-01
## 138	138	-2.099013e-02	-1.989868e-02	-1.167256e-01
## 139	139	1.532152e-14	2.182608e-01	2.182608e-01
## 140	140	-3.266158e-01	-3.227087e-01	-2.920960e-01
## 141	141	2.844858e-01	3.930028e-01	3.964209e-01
## 142	142	1.749560e-02	-4.369135e-02	2.191459e-01
## 143	143	1.589919e-01	1.161862e-01	-1.186111e-01
## 144	144	-2.880719e-01	-2.390838e-01	-1.627114e-01
## 145	145	7.129166e-02	1.747942e-02	-1.570651e-03
## 146	146	-8.525160e-02	-5.438774e-02	-8.946542e-02
## 147	147	1.604074e-01	2.395459e-02	1.208080e-01
## 148	148	-1.129395e-01	-9.985990e-02	-1.912492e-01
## 149	149	1.159549e-02	-5.101234e-02	6.783905e-02
## 150	150	1.169599e-01	1.101477e-01	-7.091755e-03
## 151	151	3.483040e-01	4.200808e-01	4.411998e-01
## 152	152	-2.958194e-01	-3.197219e-01	-3.473043e-01
## 153	153	-1.862845e-01	-8.362445e-02	-2.161069e-01
## 154	154	3.729219e-01	1.101840e-01	2.918802e-01
## 155	155	-6.320275e-02	-1.734742e-01	-1.786917e-01
## 156	156	-1.502378e-01	-1.125469e-01	1.018548e-01
## 157	157	1.001469e-01	3.341949e-02	-1.240656e-02
## 158	158	-2.599120e-01	-1.861515e-01	-3.046896e-01
## 159	159	-8.558104e-02	-8.813436e-02	-6.774765e-02
## 160	160	5.557588e-01	6.600986e-01	1.007707e+00
## 161	161	-1.084014e-01	-1.439016e-01	-3.315946e-02
## 162	162	-1.703974e-01	-1.343106e-01	-3.597543e-01
## 163	163	1.793744e-14	3.820011e-15	-1.048879e-01
## 164	164	-5.122347e-02	-9.996438e-02	-2.274271e-01
## 165	165	-1.215443e-01	-1.370579e-01	-4.389804e-01
## 166	166	1.678473e-01	2.183324e-01	3.544522e-02
## 167	167	1.059920e-01	7.637495e-02	4.712762e-01
## 168	168	1.306653e-01	3.349411e-02	-3.819645e-01
## 169	169	6.567729e-01	8.190908e-01	7.405618e-01
## 170	170	3.602725e-01	5.028609e-01	3.815327e-01
## 171	171	-4.033981e-02	-8.868402e-02	-2.164336e-02
## 172	172	-3.657935e-03	2.296255e-02	1.018985e-01
## 173	173	-4.411085e-01	-3.937500e-01	-3.906300e-01
## 174	174	3.771867e-01	4.977213e-01	1.664292e-01
## 175	175	-1.996506e-01	-1.803037e-01	-2.774098e-01
## 176	176	-1.142767e-01	-2.562863e-01	-3.979235e-01
## 177	177	1.439381e-01	1.027902e-01	1.264248e-01
## 178	178	-1.078127e-01	-1.507768e-02	-1.638049e-01
## 179	179	-4.760511e-02	-6.724972e-02	-2.334620e-01
## 180	180	1.361716e-01	2.263724e-01	-6.341085e-02
## 181	181	9.099699e-02	1.886912e-01	1.073382e-01
## 182	182	-1.670975e-01	-1.729883e-01	-3.193900e-01
## 183	183	-6.476804e-02	9.568245e-02	6.003129e-02
## 184	184	1.621738e-01	1.778617e-01	4.144680e-02
## 185	185	-9.584756e-02	-1.174925e-01	-1.294204e-02

## 186	186	-1.846275e-01	-2.135727e-01	-4.115251e-01
## 187	187	8.886727e-02	1.082409e-01	-1.308964e-01
## 188	188	-2.281110e-01	-2.024358e-01	-3.745003e-01
## 189	189	6.960362e-03	1.768188e-02	9.594382e-02
## 190	190	-7.248121e-02	-8.452388e-03	2.874475e-02
## 191	191	-1.702334e-01	-2.147600e-01	-9.052005e-02
## 192	192	5.479348e-03	-6.526731e-02	8.577935e-02
## 193	193	-1.387172e-01	-1.773237e-01	8.968526e-02
## 194	194	-1.922274e-01	-1.819685e-01	1.560616e-01
## 195	195	3.181244e-01	4.472641e-01	3.847866e-01
## 196	196	1.922113e-14	2.249281e-15	3.067201e-15
## 197	197	-6.148349e-02	-5.923503e-02	1.333740e-01
## 198	198	2.646361e-01	1.816748e-01	-1.785612e-01
## 199	199	-9.521310e-02	-6.146714e-02	1.219759e-02
## 200	200	1.652938e-02	5.136740e-02	9.615151e-02
## 201	201	-4.866595e-02	-3.495328e-02	-1.469469e-01
## 202	202	-4.568802e-02	-1.554615e-01	-1.205033e-01
## 203	203	1.283635e-01	9.292794e-02	3.400965e-01
## 204	204	1.705179e-01	-3.022290e-02	9.549074e-02
## 205	205	2.070598e-14	3.002605e-01	4.911291e-01
## 206	206	-1.134018e-01	5.371955e-02	3.270022e-02
## 207	207	2.468037e-02	2.410310e-02	1.256990e-01
## 208	208	3.869675e-01	4.799870e-01	7.898818e-01
## 209	209	1.453210e-01	2.535058e-01	1.656923e-01
## 210	210	-1.109958e-01	-9.357038e-02	-1.542366e-01
## 211	211	-4.401968e-02	-2.778632e-02	1.663056e-01
## 212	212	2.391804e-01	2.607101e-01	4.379767e-01
## 213	213	-1.097775e-01	-1.383697e-01	-1.614379e-01
## 214	214	-3.662375e-02	5.144167e-02	5.411194e-01
## 215	215	2.127473e-14	-3.240106e-01	-1.565703e-01
## 216	216	-3.698679e-01	-3.562137e-01	-3.471797e-01
## 217	217	-1.533072e-01	-1.907112e-01	-2.850327e-01
## 218	218	-1.416273e-01	-1.246323e-01	1.548055e-01
## 219	219	2.333655e-01	2.959005e-01	1.646441e-01
## 220	220	-1.913814e-01	-2.855133e-01	-2.251447e-01
## 221	221	6.885756e-01	6.563384e-01	5.875573e-01
## 222	222	-1.086464e-01	-1.328306e-01	-1.758186e-01
## 223	223	-4.239373e-02	7.770489e-02	-5.721002e-04
## 224	224	-5.961700e-03	-5.136655e-02	-2.382130e-01
## 225	225	-5.480233e-02	-1.751328e-01	-3.259154e-01
## 226	226	1.522234e-14	-1.175088e-01	-1.175088e-01
## 227	227	4.730021e-02	6.280063e-02	2.694712e-02
## 228	228	1.796143e-01	5.429482e-02	1.725024e-02
## 229	229	2.671456e-02	7.091322e-02	2.605375e-02
## 230	230	-1.285079e-01	-1.189642e-01	-2.541264e-01
## 231	231	-3.320296e-01	-3.435306e-01	-3.927518e-01
## 232	232	1.417115e-02	-7.515264e-02	-1.240344e-01
## 233	233	9.163529e-02	1.340781e-02	-3.807665e-02
## 234	234	-9.642684e-02	-1.041091e-01	-2.198717e-02
## 235	235	2.514891e-14	1.205769e-15	-2.044243e-01
## 236	236	1.653653e-01	1.995127e-01	4.462781e-02
## 237	237	-2.159263e-01	-2.079338e-01	-8.073236e-02
## 238	238	4.384436e-01	6.750767e-01	2.578528e-01
## 239	239	-2.135840e-01	-3.009239e-01	-3.121978e-01

## 240	240	-4.981726e-02	-6.639006e-02	-6.861374e-02
## 241	241	-2.762731e-01	-3.358401e-01	-3.001239e-01
## 242	242	9.561046e-02	-2.696027e-02	-2.640772e-01
## 243	243	4.949368e-02	5.985034e-02	7.078044e-01
## 244	244	-4.199539e-02	-7.241044e-02	-3.943890e-01
## 245	245	-2.872154e-01	-2.796242e-01	-2.055324e-01
## 246	246	-8.778023e-02	-5.470609e-02	4.314203e-02
## 247	247	-3.104605e-02	-6.274839e-02	-1.149835e-02
## 248	248	2.028660e-01	3.248400e-01	1.426893e-01
## 249	249	-1.515202e-01	-2.203543e-01	-4.530669e-01
## 250	250	-4.758634e-02	1.999798e-02	3.309029e-01
## 251	251	-1.179623e-01	-3.947986e-02	-1.132722e-01
## 252	252	-3.809209e-01	-3.729377e-01	-2.704421e-01
## 253	253	-3.561912e-01	-2.861798e-01	-3.221123e-01
## 254	254	1.262417e-01	1.262417e-01	1.262417e-01
## 255	255	1.113701e-01	8.747213e-02	3.376933e-01
## 256	256	-1.121292e-01	2.282579e-02	-7.105083e-02
## 257	257	2.425737e-01	1.313958e-01	5.611168e-01
## 258	258	-1.193984e-01	-9.285053e-02	-7.318027e-02
## 259	259	1.585450e-01	1.262671e-01	4.929466e-01
## 260	260	-1.490268e-02	5.724348e-02	1.113124e-02
## 261	261	-1.240030e-01	-1.624291e-02	-2.310988e-01
## 262	262	1.969681e-01	2.511147e-01	6.206520e-02
## 263	263	1.489768e-01	2.237117e-01	9.803141e-02
## 264	264	1.321335e-01	1.733950e-01	7.869922e-02
## 265	265	-1.430835e-01	-1.315291e-01	-1.148137e-01
## 266	266	1.069075e-01	5.599515e-02	-2.138012e-01
## 267	267	3.993461e-01	3.014717e-01	5.918005e-01
## 268	268	-1.225302e-01	-8.120381e-02	-9.705247e-02
## 269	269	-9.782824e-02	-1.541817e-01	-2.428945e-01
## 270	270	-1.081553e-01	-1.159513e-01	-2.043669e-02
## 271	271	2.634612e-01	4.009259e-01	-7.361318e-02
## 272	272	-1.561052e-01	-2.876138e-01	-1.560518e-01
## 273	273	-5.366425e-02	-9.067168e-03	1.622370e-01
## 274	274	1.243178e-01	3.323978e-02	-3.832554e-01
## 275	275	2.198286e-01	2.956808e-01	4.839835e-01
## 276	276	-1.537094e-02	-1.017430e-01	8.395336e-02
## 277	277	2.153182e-14	5.986471e-01	4.848145e-01
## 278	278	-1.253297e-01	-1.496262e-01	-2.181050e-01
## 279	279	-2.006189e-01	-2.047029e-01	-2.113242e-01
## 280	280	5.423574e-02	-1.421555e-02	-9.466893e-02
## 281	281	-9.096591e-02	-8.582269e-02	-2.256990e-01
## 282	282	-1.305923e-01	-2.347303e-01	-2.015817e-01
## 283	283	-1.587833e-01	-1.852040e-01	-6.921682e-03
## 284	284	-1.673128e-02	-1.687573e-01	-3.176689e-01
## 285	285	-6.456332e-02	-1.008694e-01	-4.994307e-02
## 286	286	-7.966557e-03	-1.382304e-01	1.666150e-01
## 287	287	-1.486488e-01	-1.486488e-01	-1.486488e-01
## 288	288	-7.954225e-02	2.339056e-02	-6.097291e-02
## 289	289	-3.024629e-02	-1.467168e-01	-2.586265e-01
## 290	290	-1.978058e-01	-1.661541e-01	-2.931913e-01
## 291	291	1.602480e-01	2.112769e-01	9.989159e-02
## 292	292	-2.234989e-01	-2.270558e-01	-2.285051e-01
## 293	293	-2.469942e-02	1.299745e-02	-1.384747e-01

## 294	294	4.635068e-03	1.120406e-01	-3.508507e-02
## 295	295	1.303594e-01	2.083907e-01	2.537226e-01
## 296	296	3.403005e-01	4.720271e-01	4.536526e-01
## 297	297	-8.464857e-02	-9.902590e-02	-3.501701e-02
## 298	298	-3.191925e-02	-3.786614e-02	2.836181e-02
## 299	299	2.133284e-14	-1.705063e-01	-4.307185e-02
## 300	300	1.132205e-02	2.935016e-01	1.031498e+00
## 301	301	5.740394e-02	6.731060e-02	-2.528290e-02
## 302	302	-3.123918e-01	-1.004972e-01	-3.005328e-01
## 303	303	1.115718e-03	4.788111e-02	-9.157045e-02
## 304	304	3.849891e-01	3.029188e-01	6.335022e-01
## 305	305	-2.462931e-01	-2.199012e-01	-1.872571e-01
## 306	306	1.511543e-01	2.686029e-01	-5.936473e-03
## 307	307	-3.186169e-01	-2.833461e-01	-1.296030e-01
## 308	308	2.848305e-01	2.824545e-01	1.397167e-01
## 309	309	-1.848307e-01	-3.265412e-02	-2.614209e-01
## 310	310	2.199894e-01	1.179612e-01	-1.977999e-01
## 311	311	-4.674810e-02	-9.723282e-03	-2.247944e-01
## 312	312	1.972215e-14	-1.736314e-03	1.364456e-01
## 313	313	1.786834e-01	8.648206e-02	6.000222e-01
## 314	314	-6.812344e-02	6.533278e-02	-2.824470e-01
## 315	315	-1.551220e-01	-1.154796e-01	-8.344618e-02
## 316	316	3.811575e-01	2.607276e-01	7.909932e-02
## 317	317	-1.475338e-01	-1.374601e-01	2.087723e-02
## 318	318	-1.327589e-01	1.098752e-01	-3.603816e-02
## 319	319	4.141227e-01	4.772349e-01	7.662220e-01
## 320	320	-5.268667e-01	-4.792374e-01	-5.108759e-01
## 321	321	-1.448344e-01	-1.368225e-01	-2.117066e-01
## 322	322	1.534837e-01	7.600236e-02	2.967108e-01
## 323	323	-1.308777e-01	-2.344779e-01	-3.095251e-01
## 324	324	2.569554e-01	3.100942e-01	3.480151e-01
## 325	325	4.719617e-01	6.218883e-01	5.733184e-01
## 326	326	2.228197e-14	1.695081e-02	-9.511280e-02
## 327	327	1.695358e-01	1.754753e-01	-3.283434e-02
## 328	328	-1.017248e-01	-9.408266e-02	-8.887587e-02
## 329	329	-1.493812e-02	-4.543980e-02	-7.440896e-02
## 330	330	3.573125e-01	5.107695e-01	8.575566e-01
## 331	331	4.511180e-02	1.628055e-02	-3.963737e-01
## 332	332	-2.599120e-01	-1.861515e-01	-3.046896e-01
## 333	333	2.112055e-14	-3.106303e-01	-4.454628e-01
## 334	334	-1.923199e-01	-1.305012e-01	-1.820600e-01
## 335	335	-3.109205e-01	-2.990240e-01	-3.414742e-01
## 336	336	-1.696051e-01	-1.242043e-01	-1.956811e-01
## 337	337	2.646361e-01	1.816748e-01	-1.785612e-01
## 338	338	3.313194e-01	2.873484e-01	2.196464e-01
## 339	339	-1.287390e-01	-1.507240e-01	-2.544784e-01
## 340	340	2.316122e-02	9.840846e-02	1.139309e-01
## 341	341	2.561273e-01	4.162721e-01	1.809800e-01
## 342	342	-3.061583e-02	-5.007274e-02	1.459019e-01
## 343	343	1.348881e-02	4.694653e-02	3.298549e-02
## 344	344	4.771475e-01	3.994542e-01	4.850020e-01
## 345	345	-4.411085e-01	-3.937500e-01	-3.906300e-01
## 346	346	2.275491e-02	3.720300e-02	-3.042869e-02
## 347	347	-1.333038e-01	-1.571490e-01	-2.237290e-01

## 348	348	-3.448963e-01	-2.917618e-01	-1.934385e-01
## 349	349	1.995516e-14	1.448102e-01	-6.811824e-02
## 350	350	-5.915364e-02	-1.919585e-01	3.719802e-01
## 351	351	-6.200761e-02	-9.080908e-02	-1.191291e-01
## 352	352	-8.611448e-03	-6.687092e-02	2.599256e-01
## 353	353	2.209945e-14	-8.641695e-02	-1.988225e-01
## 354	354	-2.190504e-01	-2.456036e-01	-1.931409e-01
## 355	355	1.436383e-01	1.271811e-01	1.819164e-01
## 356	356	-6.961075e-02	-1.635128e-02	-2.439638e-01
## 357	357	1.267355e-01	6.286237e-02	6.248371e-02
## 358	358	8.132559e-03	9.630905e-02	1.048703e-01
## 359	359	1.734142e-01	5.345898e-02	1.275011e-02
## 360	360	6.065057e-02	-2.371202e-02	-9.890834e-02
## 361	361	2.181524e-01	5.429143e-02	1.515277e-01
## 362	362	-2.168911e-01	-1.994544e-01	-7.121913e-02
## 363	363	2.555624e-01	1.854436e-01	-6.097291e-02
## 364	364	-1.836181e-01	-2.401637e-01	-1.677446e-01
## 365	365	-1.485892e-02	-1.121130e-02	-3.362908e-03
## 366	366	-2.065385e-01	-3.057925e-01	-3.239300e-01
## 367	367	-1.298765e-01	-1.971726e-01	-2.173430e-01
## 368	368	2.556046e-01	3.786191e-01	3.191050e-01
## 369	369	1.241012e-01	1.895177e-01	1.795621e-01
## 370	370	-1.003987e-02	9.422139e-02	9.429932e-02
## 371	371	2.425737e-01	1.313958e-01	5.611168e-01
## 372	372	-1.425423e-01	-1.505138e-01	-5.740655e-01
## 373	373	1.006145e-01	2.061412e-02	5.877916e-02
## 374	374	-2.702759e-02	5.860990e-02	-1.916737e-01
## 375	375	2.287962e-01	2.167238e-01	1.433308e-01
## 376	376	-1.317845e-01	-1.706574e-01	-3.771853e-01
## 377	377	1.136285e-01	9.806562e-02	-1.105183e-01
## 378	378	-7.581922e-02	-6.418266e-02	-1.680285e-01
## 379	379	-3.076174e-01	-1.957455e-01	-5.417677e-01
## 380	380	2.649770e-01	2.649770e-01	2.649770e-01
## 381	381	6.462826e-02	4.199552e-02	-1.265598e-01
## 382	382	-6.851165e-02	-8.516563e-02	-2.054373e-01
## 383	383	-8.591065e-04	-3.831312e-02	-1.311924e-02
## 384	384	-6.887308e-02	-9.933779e-02	-5.008850e-02
## 385	385	8.572885e-02	7.653607e-02	-1.672841e-01
## 386	386	-1.212710e-02	-1.647719e-01	-2.013424e-01
## 387	387	2.314339e-14	5.481330e-15	1.093192e-02
## 388	388	-1.360578e-01	-1.785229e-01	-1.281699e-01
## 389	389	-1.495571e-02	-8.403475e-02	6.355076e-02
## 390	390	-1.262417e-01	-1.262417e-01	-1.262417e-01
## 391	391	-1.858582e-01	-2.431466e-01	-3.388982e-01
## 392	392	3.615093e-01	4.821657e-01	6.452019e-01
## 393	393	-1.777213e-01	-3.782175e-01	-2.537253e-01
## 394	394	1.955016e-14	-3.400028e-15	-7.859265e-02
## 395	395	-6.071172e-03	7.196573e-02	-2.310708e-01
## 396	396	-2.342360e-01	-3.295192e-01	3.949829e-02
## 397	397	-1.563878e-02	3.011290e-02	5.273204e-01
## 398	398	3.986719e-02	-3.682410e-02	1.769369e-01
## 399	399	1.555254e-02	3.986873e-02	-1.842207e-01
## 400	400	9.573096e-02	6.600149e-02	1.315687e-02
## 401	401	-2.614769e-01	-3.071508e-01	-2.268411e-01

## 402	402	-1.489333e-01	-1.630872e-01	-3.045471e-01
## 403	403	2.401392e-02	-5.558687e-02	-1.744158e-01
## 404	404	-1.902849e-01	-1.530451e-01	-3.938930e-01
## 405	405	-1.939521e-04	1.970577e-02	2.998190e-01
## 406	406	2.094776e-01	3.212758e-01	4.582195e-01
## 407	407	1.406380e-01	1.372563e-01	1.087428e-01
## 408	408	2.047045e-14	1.051447e+00	2.085033e+00
## 409	409	-6.840891e-02	8.191836e-03	-3.123213e-02
## 410	410	1.291542e-02	-3.201060e-03	1.200988e-01
## 411	411	2.364346e-01	1.381277e-01	6.712089e-01
## 412	412	1.267806e-01	1.590632e-01	-3.784662e-02
## 413	413	2.489712e-14	2.699687e-15	-7.443997e-02
## 414	414	2.013751e-01	1.615117e-01	3.506615e-01
## 415	415	-4.389205e-02	1.483369e-04	-1.460309e-01
## 416	416	-3.296635e-01	-3.131422e-01	-2.565911e-01
## 417	417	1.633878e-01	2.511149e-01	7.026134e-03
## 418	418	-1.372698e-01	-1.898735e-01	-3.816172e-01
## 419	419	2.108306e-01	1.507929e-01	-9.633031e-02
## 420	420	1.969821e-14	-1.629176e-15	-1.889274e-01
## 421	421	-8.420941e-02	-1.317706e-01	9.128955e-03
## 422	422	-2.937683e-01	-2.539725e-01	7.187257e-02
## 423	423	1.622410e-02	2.945137e-02	7.986397e-02
## 424	424	8.706861e-02	7.623638e-03	-4.335159e-02
## 425	425	5.169720e-02	-3.617138e-02	-4.497273e-01
## 426	426	-9.401863e-02	-1.069471e-01	-5.805721e-02
## 427	427	-2.748712e-01	-3.747704e-01	-2.768651e-01
## 428	428	-2.469084e-01	-2.172965e-01	-2.477201e-01
## 429	429	-2.188480e-01	-2.461664e-01	-4.817818e-01
## 430	430	3.932614e-02	-3.336409e-02	1.719764e-01
## 431	431	-7.527670e-02	-6.194760e-02	-1.708086e-01
## 432	432	-5.073719e-02	-1.297099e-01	-1.574410e-01
## 433	433	2.181395e-14	3.078043e-15	3.444526e-01
## 434	434	1.784158e-01	1.437603e-01	-2.031328e-01
## 435	435	-3.498258e-01	-2.796299e-01	-1.611890e-01
## 436	436	2.933394e-01	3.738269e-01	4.914344e-01
## 437	437	-2.438268e-01	-1.496844e-01	-4.793726e-02
## 438	438	1.691289e-02	-1.425577e-02	-9.179270e-02
## 439	439	1.502491e-01	8.556289e-02	1.583619e-01
## 440	440	3.017983e-01	2.548415e-01	-1.328335e-01
## 441	441	1.729077e-14	2.161347e-15	-7.859265e-02
## 442	442	-5.690221e-03	3.435379e-02	-1.960140e-01
## 443	443	2.781995e-01	1.501158e-01	1.037650e-01
## 444	444	2.425737e-01	1.313958e-01	5.611168e-01
## 445	445	-7.672385e-03	2.468522e-02	-1.237755e-01
## 446	446	-4.153319e-02	-4.542165e-01	-2.084126e-01
## 447	447	-2.535671e-02	-6.928616e-02	-2.536369e-02
## 448	448	-4.088573e-01	-3.627837e-01	-4.631225e-01
## 449	449	-4.495347e-02	2.294080e-03	1.633455e-02
## 450	450	2.006238e-14	1.265195e-15	2.626538e-01
## 451	451	-3.076174e-01	-1.957455e-01	-5.417677e-01
## 452	452	-1.107423e-01	-3.204886e-01	-4.068467e-01
## 453	453	-2.148341e-01	-1.262608e-01	-4.194962e-02
## 454	454	2.057952e-14	2.797216e-15	9.107762e-03
## 455	455	3.086866e-01	3.568268e-01	1.671629e-01

## 456	456	1.937031e-14	1.229528e-01	4.896925e-01
## 457	457	1.668026e-01	9.356751e-02	-2.135471e-02
## 458	458	-3.490694e-01	-3.237212e-01	-1.131479e-01
## 459	459	-1.850929e-02	-1.339232e-01	-5.200311e-02
## 460	460	7.451085e-02	1.174610e-01	6.140594e-02
## 461	461	-8.880821e-02	-1.275264e-01	-8.448523e-02
## 462	462	2.156463e-01	1.062114e-01	-2.998046e-01
## 463	463	-1.247640e-01	-1.431691e-01	-2.596760e-01
## 464	464	2.646361e-01	1.816748e-01	-1.785612e-01
## 465	465	-1.922960e-01	-1.679458e-01	-1.499039e-01
## 466	466	4.923066e-02	6.667869e-02	2.480934e-01
## 467	467	-5.276743e-02	3.089106e-02	1.928829e-01
## 468	468	-6.854888e-02	-4.128013e-02	-1.303350e-01
## 469	469	-2.343362e-01	-2.916071e-01	-4.447937e-01
## 470	470	3.649124e-01	2.127566e-01	1.854580e-01
## 471	471	1.265958e-02	5.145506e-02	4.269019e-01
## 472	472	7.276604e-03	-8.369605e-02	6.410499e-02
## 473	473	-1.209744e-01	-1.706710e-01	-3.898269e-01
## 474	474	1.924233e-14	3.141605e-15	5.042906e-01
## 475	475	7.324857e-02	2.145885e-01	3.742456e-01
## 476	476	1.613757e-01	2.480895e-02	1.217432e-01
## 477	477	2.449726e-01	2.380228e-01	1.633184e-01
## 478	478	9.709950e-02	5.007703e-02	1.665397e-01
## 479	479	-1.795486e-01	-3.570144e-01	-4.223624e-01
## 480	480	-6.448207e-02	7.823872e-02	4.693985e-02
## 481	481	-5.542305e-02	-9.048841e-02	-2.361764e-01
## 482	482	-1.577915e-01	-1.184492e-01	-2.357656e-01
## 483	483	2.917024e-01	3.670540e-01	2.289295e-01
## 484	484	3.887080e-01	4.555823e-01	3.196951e-01
## 485	485	-3.375885e-01	-3.432440e-01	-5.522129e-01
## 486	486	-3.488122e-01	-2.362790e-01	-5.445140e-01
## 487	487	7.334095e-02	7.049915e-02	2.570985e-01
## 488	488	-6.112263e-02	-9.127755e-02	-1.156064e-01
## 489	489	-2.499558e-01	-1.953408e-01	-2.043710e-01
## 490	490	-7.046967e-02	-8.431129e-02	9.819901e-02
## 491	491	-9.899250e-03	5.201768e-02	2.922602e-01
## 492	492	5.961725e-03	4.984801e-02	-2.515252e-01
## 493	493	1.996397e-01	2.058164e-01	6.354804e-01
## 494	494	6.558576e-02	9.380307e-02	1.421806e-01
## 495	495	-1.388501e-01	-2.322803e-01	4.876809e-02
## 496	496	-3.616342e-02	8.241544e-02	-2.474245e-01
## 497	497	-1.456392e-01	-7.253731e-02	2.053609e-01
## 498	498	-7.582705e-02	-1.728797e-02	-3.966310e-02
## 499	499	8.925116e-02	1.335797e-01	2.286012e-01
## 500	500	1.582785e-01	2.047526e-01	-1.871603e-04
## 501	501	-3.513908e-02	-2.378140e-01	-1.889259e-02
## 502	502	5.580311e-01	6.281837e-01	4.656003e-01
## 503	503	-3.742502e-01	-4.139571e-01	-6.709087e-01
## 504	504	-2.075653e-01	-2.524130e-01	-2.235847e-01
## 505	505	2.774592e-01	4.075748e-01	3.654228e-01
## 506	506	8.987203e-02	1.001559e-01	1.262450e-01
## 507	507	1.850638e-01	1.351991e-01	-4.771972e-02
## 508	508	2.363182e-01	6.184303e-02	2.019684e-02
## 509	509	2.055484e-02	8.927539e-02	2.034235e-02

## 510	510	-2.594494e-01	-2.558581e-01	-1.195922e-01
## 511	511	5.106386e-01	6.165821e-01	4.091520e-01
## 512	512	6.438729e-02	3.350225e-02	-1.364693e-01
## 513	513	1.069075e-01	5.599515e-02	-2.138012e-01
## 514	514	-1.376292e-01	-5.875409e-02	-2.937823e-02
## 515	515	-3.965955e-02	-7.827824e-02	-5.303506e-02
## 516	516	2.603558e-01	1.208844e-01	5.001915e-02
## 517	517	-4.526720e-02	-6.536189e-02	-1.879415e-01
## 518	518	2.617006e-14	2.209161e-15	1.695421e-01
## 519	519	-1.846337e-01	-1.401889e-01	-3.101167e-01
## 520	520	-2.078249e-01	-6.233481e-02	3.550181e-02
## 521	521	1.791209e-01	1.810435e-01	-7.983712e-02
## 522	522	2.004142e-02	-1.983394e-02	1.466815e-01
## 523	523	-1.005608e-01	-1.842435e-01	-1.593156e-01
## 524	524	-9.595313e-02	-8.229132e-02	3.666516e-01
## 525	525	-1.627153e-01	-1.706755e-01	-6.139472e-04
## 526	526	-4.011959e-02	-1.129753e-01	2.202723e-01
## 527	527	8.450127e-02	9.421756e-02	-5.575408e-02
## 528	528	-1.370903e-01	-7.587023e-02	-7.495741e-02
## 529	529	9.142517e-02	3.565222e-02	-2.268811e-01
## 530	530	-1.099654e-03	-1.099505e-01	-1.659597e-01
## 531	531	-2.948592e-02	4.233047e-03	2.746796e-01
## 532	532	-1.195857e-01	-9.444064e-02	1.147221e-01
## 533	533	-1.114031e-01	-1.163887e-01	-2.839819e-01
## 534	534	3.551263e-02	3.030230e-01	5.186904e-01
## 535	535	2.085417e-14	2.275001e-15	-1.388406e-01
## 536	536	2.069318e-14	-1.496603e-01	9.792652e-02
## 537	537	1.791320e-01	1.195340e-01	8.310680e-02
## 538	538	-1.778418e-01	-1.790479e-01	-6.814184e-02
## 539	539	8.489718e-02	2.372595e-15	8.860928e-02
## 540	540	-2.594875e-02	-5.434540e-02	9.557192e-02
## 541	541	-1.010565e-01	-1.040689e-01	-2.239004e-02
## 542	542	2.229892e-01	2.381371e-01	-3.441699e-02
## 543	543	-3.654600e-02	-1.125109e-01	-1.205988e-01
## 544	544	4.496636e-02	2.944560e-03	3.041219e-02
## 545	545	-1.627766e-01	-1.163481e-01	-5.463578e-02
## 546	546	1.038864e-01	-4.080400e-03	-4.540005e-02
## 547	547	-1.347019e-02	1.180433e-01	8.166458e-02
## 548	548	1.151664e-01	9.300723e-02	3.963611e-02
## 549	549	2.533318e-02	2.379976e-02	1.645106e-01
## 550	550	-1.672781e-01	-1.751328e-01	-3.636909e-01
## 551	551	-8.519858e-02	-4.573543e-02	1.565215e-01
## 552	552	1.826467e-14	-7.890381e-02	-4.270804e-02
## 553	553	-2.213881e-01	-1.427892e-01	-1.838903e-01
## 554	554	1.929025e-02	8.765083e-02	3.153943e-01
## 555	555	1.377097e-01	2.260388e-01	3.982788e-01
## 556	556	1.674096e-01	1.329999e-01	-2.603510e-01
## 557	557	-3.149181e-01	-3.403674e-01	-1.977080e-01
## 558	558	3.688757e-03	-8.375750e-03	-1.739313e-01
## 559	559	-3.188390e-02	-8.280374e-02	-2.673610e-02
## 560	560	-2.635293e-01	-2.903702e-01	-3.884517e-01
## 561	561	1.080072e-01	6.285954e-02	-3.049395e-02
## 562	562	-1.384452e-01	-1.679289e-01	-8.951245e-03
## 563	563	-3.707994e-02	-1.076529e-02	2.219342e-02

## 564	564	-1.864759e-03	3.230784e-02	-1.193005e-02
## 565	565	-5.423496e-03	8.912476e-03	-1.081718e-01
## 566	566	1.069075e-01	5.599515e-02	-2.138012e-01
## 567	567	3.950630e-02	3.886671e-02	-1.146513e-01
## 568	568	7.355990e-02	1.028900e-02	3.963340e-01
## 569	569	-1.312377e-01	-1.445538e-01	4.087174e-02
## 570	570	4.107962e-01	5.874302e-01	4.376096e-01
## 571	571	-4.832442e-01	-4.494483e-01	-4.418493e-01
## 572	572	-1.790340e-01	-1.329711e-01	1.497885e-01
## 573	573	-1.402237e-01	-1.215985e-01	-1.115860e-02
## 574	574	5.915762e-02	5.253761e-02	1.347998e-01
## 575	575	-4.510823e-02	1.603657e-02	-2.408513e-01
## 576	576	-1.285079e-01	-1.189642e-01	-2.541264e-01
## 577	577	2.161923e-14	3.838929e-15	5.179056e-01
## 578	578	-2.448821e-01	-1.339400e-01	-2.215317e-01
## 579	579	8.108269e-03	-1.792053e-02	4.954439e-01
## 580	580	-3.617449e-02	-3.820319e-02	-6.046458e-02
## 581	581	-2.907505e-01	-2.573674e-01	-4.532031e-02
## 582	582	-9.026050e-02	-5.911425e-02	-9.943440e-02
## 583	583	-7.723454e-02	-1.075886e-01	1.125240e-03
## 584	584	-2.747838e-01	-2.503148e-01	-2.781246e-01
## 585	585	-7.334613e-02	-6.871800e-02	-3.706396e-01
## 586	586	-2.014309e-01	-2.766550e-01	-4.533727e-01
## 587	587	1.615154e-01	4.320534e-01	1.176727e-01
## 588	588	6.599355e-02	8.409502e-02	3.005228e-01
## 589	589	1.595343e-01	-7.062208e-02	9.991661e-02
## 590	590	-2.160995e-01	-2.793482e-01	-2.084146e-01
## 591	591	1.405392e-01	1.652531e-01	1.816047e-01
## 592	592	-1.233012e-01	-2.273161e-01	3.868613e-03
## 593	593	1.945853e-14	3.708844e-01	-1.392336e-02
## 594	594	1.549475e-01	2.071933e-01	2.478048e-02
## 595	595	-1.147292e-01	-1.729717e-01	-3.547568e-01
## 596	596	-1.269262e-01	-5.572234e-02	-1.086432e-01
## 597	597	-2.368195e-01	-1.259316e-01	-1.497280e-01
## 598	598	3.597045e-01	3.773574e-01	1.485249e-01
## 599	599	-2.914530e-01	-3.337171e-01	-2.676833e-01
## 600	600	4.210983e-02	-4.142963e-02	7.666778e-02
## 601	601	4.797937e-02	6.628912e-02	1.193313e-01
## 602	602	-1.472962e-01	-8.384269e-02	-1.087567e-01
## 603	603	3.675537e-02	-4.439789e-02	2.836129e-02
## 604	604	4.523053e-01	4.259474e-01	3.925296e-01
## 605	605	-1.164366e-02	-3.731939e-02	-6.411783e-02
## 606	606	-4.685400e-02	4.587974e-02	-1.691258e-02
## 607	607	6.854996e-02	1.287616e-01	-1.853805e-01
## 608	608	-1.161017e-01	-1.062716e-01	-1.416814e-01
## 609	609	-3.250475e-01	-2.514925e-01	1.606062e-02
## 610	610	2.117322e-14	3.433495e-15	-2.016888e-01
## 611	611	3.525944e-02	2.718721e-02	2.075304e-01
## 612	612	-1.586122e-01	-1.773054e-01	-3.070488e-01
## 613	613	2.065773e-14	2.022435e-15	-1.359734e-01
## 614	614	6.902019e-02	1.706427e-01	-2.536835e-02
## 615	615	1.880348e-14	-2.624372e-01	3.865652e-02
## 616	616	-8.962407e-02	-1.181199e-01	-2.324911e-01
## 617	617	5.717215e-02	8.539924e-02	1.976395e-01

## 618	618	-1.457425e-01	-1.383219e-01	-5.555565e-01
## 619	619	7.302177e-02	-7.390258e-02	-2.253158e-01
## 620	620	-3.005639e-01	-3.316788e-01	-2.359290e-01
## 621	621	2.550522e-01	2.034889e-01	1.486890e-01
## 622	622	1.144367e-02	1.828521e-02	-3.053902e-02
## 623	623	2.138372e-14	9.809046e-16	6.870940e-01
## 624	624	-1.337001e-01	-1.000526e-01	-2.955057e-01
## 625	625	5.979759e-02	1.176680e-01	-2.652958e-02
## 626	626	-2.568807e-01	-3.592585e-01	-2.589241e-01
## 627	627	2.186285e-14	1.330782e-15	-1.990099e-01
## 628	628	2.149090e-14	9.768589e-16	-3.307409e-01
## 629	629	5.521018e-01	6.701150e-01	4.179289e-01
## 630	630	7.577769e-02	5.538258e-02	-4.350997e-03
## 631	631	-1.588451e-01	-3.709223e-02	-3.052480e-01
## 632	632	-6.257697e-02	-1.668325e-01	-1.668325e-01
## 633	633	-2.799820e-01	-2.190533e-01	-2.981600e-02
## 634	634	9.788943e-04	-3.455512e-02	-2.775682e-01
## 635	635	-4.482869e-02	4.171138e-02	6.799853e-02
## 636	636	-1.015093e-01	-5.921886e-02	2.094064e-01
## 637	637	-1.687530e-01	-1.836148e-01	-2.909435e-01
## 638	638	-4.411085e-01	-3.937500e-01	-3.906300e-01
## 639	639	2.402626e-01	5.230648e-02	-1.636467e-02
## 640	640	2.339712e-01	3.276614e-01	3.159809e-01
## 641	641	-1.758265e-01	-2.354082e-01	-1.148926e-01
## 642	642	-1.556680e-01	8.235116e-02	-9.350323e-02
## 643	643	-4.846539e-02	-1.352929e-01	3.750768e-03
## 644	644	-2.093436e-01	-1.546463e-01	-1.466853e-01
## 645	645	1.145905e-01	1.473621e-02	2.322786e-02
## 646	646	1.266472e-01	2.436257e-01	1.508124e-01
## 647	647	2.205472e-14	1.575337e-15	-5.584359e-02
## 648	648	-1.144365e-02	-7.385575e-02	-2.125928e-01
## 649	649	-3.834881e-02	-3.620660e-02	1.200719e-01
## 650	650	4.065050e-02	1.386922e-02	1.243359e-01
## 651	651	1.333416e-01	2.147236e-01	5.942199e-01
## 652	652	8.803869e-02	9.817583e-02	2.183285e-01
## 653	653	-9.359894e-02	-1.434249e-01	-7.781885e-02
## 654	654	-3.412302e-02	-6.563767e-02	-2.416061e-01
## 655	655	1.913357e-01	-1.226981e-01	-1.907481e-01
## 656	656	-7.904155e-02	-1.396857e-01	-5.252811e-02
## 657	657	-8.938604e-03	2.718138e-02	-5.571461e-02
## 658	658	3.354408e-01	3.974092e-01	3.273419e-01
## 659	659	6.711160e-03	-8.737378e-02	-7.698603e-02
## 660	660	-3.851416e-02	-4.994958e-02	-1.586796e-02
## 661	661	2.328009e-14	1.856695e-15	-1.195318e-01
## 662	662	-1.784427e-01	-2.350259e-01	-1.084127e-01
## 663	663	1.731964e-01	6.697310e-16	1.264211e-01
## 664	664	1.013188e-01	1.532196e-01	3.525785e-01
## 665	665	-1.206174e-01	-5.375403e-02	-1.966364e-01
## 666	666	3.129711e-01	3.847046e-01	3.923309e-01
## 667	667	-7.390778e-02	-4.916425e-02	2.420614e-02
## 668	668	-1.582957e-01	-1.260383e-01	-2.794547e-01
## 669	669	8.068138e-04	1.012271e-01	-3.258850e-02
## 670	670	2.049291e-14	2.764916e-15	-1.554547e-01
## 671	671	-2.028662e-01	-7.335096e-02	-1.299681e-01

## 672	672	1.056581e-01	6.123496e-02	4.819465e-02
## 673	673	-1.635112e-01	-2.204993e-01	-2.416971e-01
## 674	674	-8.129505e-02	-1.957060e-01	-2.180954e-01
## 675	675	-1.460192e-01	-9.312087e-02	-2.171345e-01
## 676	676	2.973932e-02	-5.513772e-02	-1.150368e-01
## 677	677	1.382620e-01	1.437945e-01	1.151643e-01
## 678	678	-4.303164e-02	-1.270552e-01	1.920530e-02
## 679	679	-5.961700e-03	6.659232e-02	-1.467884e-01
## 680	680	-2.380198e-01	-2.363970e-01	-2.419786e-01
## 681	681	1.225484e-01	8.280092e-02	4.729154e-01
## 682	682	-1.437718e-01	-1.307565e-01	4.521163e-02
## 683	683	-5.251689e-02	-1.161874e-01	-4.914979e-02
## 684	684	-3.536173e-01	-3.249672e-01	-3.174835e-01
## 685	685	-2.004108e-02	1.640130e-02	-6.461534e-02
## 686	686	-3.823733e-02	1.867126e-02	-7.891645e-02
## 687	687	1.833188e-01	2.385955e-01	7.376373e-02
## 688	688	-2.733827e-01	-3.339690e-01	-1.179091e-01
## 689	689	-2.509618e-03	4.579126e-02	-1.532630e-01
## 690	690	-1.302984e-01	5.441324e-02	-1.947929e-01
## 691	691	8.983178e-02	-8.277073e-03	-3.722720e-01
## 692	692	1.210239e-14	1.216781e-01	1.216781e-01
## 693	693	1.006862e-01	1.063926e-02	1.162194e-02
## 694	694	-3.673997e-01	-5.194406e-01	-5.279711e-01
## 695	695	5.197956e-02	9.675732e-03	3.732770e-02
## 696	696	5.208950e-02	7.637024e-02	1.893996e-01
## 697	697	1.609946e-01	2.143851e-01	-7.063591e-02
## 698	698	-2.165510e-01	-1.811105e-01	-3.048487e-01
## 699	699	1.766164e-14	7.890381e-02	1.213008e-01
## 700	700	-3.841598e-02	-5.056932e-02	-5.625661e-02
## 701	701	4.025582e-01	2.535537e-01	2.095078e-01
## 702	702	-3.196763e-02	-1.784458e-01	-2.101931e-01
## 703	703	4.153249e-02	1.307680e-01	1.974710e-01
## 704	704	1.579453e-01	1.155431e-01	2.123246e-01
## 705	705	2.631371e-01	1.458237e-01	1.014916e-02
## 706	706	1.625415e-01	1.332065e-01	-5.235097e-03
## 707	707	-3.797343e-02	1.860197e-02	-2.222659e-01
## 708	708	-2.658304e-01	-3.467855e-01	-1.297437e-01
## 709	709	1.703891e-01	1.074291e-01	1.699396e-01
## 710	710	-1.285079e-01	-1.189642e-01	-2.541264e-01
## 711	711	-5.709638e-02	-1.627645e-01	-2.697550e-01
## 712	712	-3.828737e-01	-3.921611e-01	-2.236170e-01
## 713	713	-8.944370e-02	-1.148462e-01	-5.490757e-02
## 714	714	9.482294e-02	1.130143e-01	-2.058179e-01
## 715	715	1.863706e-01	2.428099e-01	2.639900e-01
## 716	716	4.174446e-01	5.618183e-01	5.150474e-01
## 717	717	-1.900944e-02	-3.271876e-02	-2.164594e-01
## 718	718	-9.651946e-02	3.755740e-02	2.899987e-01
## 719	719	1.788036e-01	-1.646081e-01	-1.240419e-01
## 720	720	1.425255e-01	1.299001e-01	-1.233436e-02
## 721	721	-2.982228e-01	-2.295401e-01	-2.241177e-01
## 722	722	3.340412e-01	2.818357e-01	3.979085e-01
## 723	723	5.986111e-01	7.107243e-01	4.912144e-01
## 724	724	2.175825e-14	4.144428e-15	1.440338e-01
## 725	725	1.009319e-01	2.455940e-01	1.583348e-01

## 726	726	1.674723e-01	6.094055e-02	2.315382e-01
## 727	727	5.723308e-01	5.994398e-01	1.135517e+00
## 728	728	-5.586670e-02	-1.168933e-01	6.963875e-02
## 729	729	5.042616e-02	4.442087e-02	-2.921164e-03
## 730	730	-2.029724e-01	-1.444046e-01	-1.134466e-01
## 731	731	4.905848e-02	1.049049e-01	1.213368e-01
## 732	732	4.794634e-03	-5.447925e-02	1.418375e-01
## 733	733	-1.539266e-01	-1.209673e-01	-7.264667e-02
## 734	734	-2.538823e-01	-2.250437e-01	-3.409219e-01
## 735	735	-3.076174e-01	-1.957455e-01	-5.417677e-01
## 736	736	2.015436e-01	2.670471e-01	4.691748e-01
## 737	737	-1.917844e-01	-1.931222e-01	-2.828734e-01
## 738	738	-5.981993e-02	-1.303723e-01	-1.953072e-01
## 739	739	-1.232863e-01	-8.217412e-02	-2.690932e-01
## 740	740	-2.121015e-02	-1.025966e-01	2.087350e-02
## 741	741	-2.585351e-01	-2.530049e-01	-1.735260e-01
## 742	742	8.591065e-04	-3.665932e-02	-1.142211e-02
## 743	743	-1.785996e-01	-1.113082e-01	-3.992261e-01
## 744	744	-1.089708e-01	-2.781696e-01	-1.723584e-01
## 745	745	-2.205140e-01	-2.677975e-01	-2.921297e-01
## 746	746	1.164120e-01	2.084312e-01	5.209129e-01
## 747	747	7.268028e-01	8.004399e-01	1.258458e+00
## 748	748	-1.820562e-02	-3.660274e-03	-8.394533e-02
## 749	749	1.918871e-01	1.179167e-01	5.712839e-02
## 750	750	-2.114066e-01	-2.261516e-01	-1.986977e-01
## 751	751	2.723247e-01	1.945532e-01	-1.094590e-01
## 752	752	2.059068e-14	-1.252250e-01	-5.503335e-02
## 753	753	2.120907e-14	2.495184e-15	-3.413249e-01
## 754	754	-2.136447e-01	-2.583302e-01	-1.669815e-01
## 755	755	-1.318610e-01	-1.662924e-01	-2.713692e-01
## 756	756	-3.925027e-01	-3.657843e-01	-4.241048e-01
## 757	757	5.205433e-01	5.191192e-01	3.491722e-01
## 758	758	6.021038e-02	-5.823622e-02	3.153961e-01
## 759	759	-3.505284e-01	-4.006423e-01	9.198796e-02
## 760	760	-5.785671e-02	-5.916179e-02	3.415515e-03
## 761	761	9.836315e-02	1.694459e-01	3.915800e-01
## 762	762	3.881230e-02	1.508755e-01	6.365474e-02
## 763	763	-1.104742e-02	1.515592e-02	-2.022067e-01
## 764	764	2.120907e-14	2.495184e-15	-3.413249e-01
## 765	765	2.129083e-14	1.653657e-15	-2.543764e-03
## 766	766	6.370227e-01	5.280577e-01	-3.303823e-02
## 767	767	-7.888979e-03	-1.502267e-01	-1.722715e-01
## 768	768	-2.299174e-01	-2.299047e-01	-9.873831e-02
## 769	769	-1.221663e-02	2.807838e-02	-1.780201e-02
## 770	770	9.412185e-01	1.012139e+00	1.031742e+00
## 771	771	-2.521412e-01	-2.403503e-01	-2.512526e-01
## 772	772	4.228384e-03	1.005362e-01	6.927790e-02
## 773	773	2.129083e-14	1.653657e-15	-2.543764e-03
## 774	774	-3.410445e-01	-3.248037e-01	-2.692126e-01
## 775	775	-3.002001e-01	-2.694222e-01	-3.366039e-01
## 776	776	-1.294344e-01	-7.752468e-02	-2.357396e-01
## 777	777	-1.436374e-01	-1.470198e-01	-3.478746e-01
## 778	778	5.717892e-02	2.809297e-02	-5.311993e-02
## 779	779	1.293890e-01	2.438901e-01	9.075384e-02

## 780	780	1.486488e-01	1.486488e-01	1.486488e-01
## 781	781	-1.512984e-01	-1.593038e-01	-3.514802e-01
## 782	782	9.058138e-02	1.119873e-01	-3.561939e-02
## 783	783	-1.780078e-01	-1.488615e-01	1.901642e-01
## 784	784	-4.502027e-02	-1.164042e-01	-2.467010e-01
## 785	785	-1.361709e-01	-7.673864e-02	-3.428782e-01
## 786	786	1.232058e-02	2.957014e-02	5.807736e-01
## 787	787	1.086062e+00	9.763415e-01	1.097154e+00
## 788	788	-4.268035e-02	1.745418e-02	3.041530e-02
## 789	789	1.709128e-01	2.177163e-01	1.566321e-01
## 790	790	1.232235e-01	-1.992271e-01	-2.979159e-02
## 791	791	-7.571747e-02	9.500373e-03	3.193728e-01
## 792	792	3.932659e-02	-3.459346e-02	2.596715e-01
## 793	793	-7.761749e-02	-6.731803e-02	-1.278126e-01
## 794	794	-6.973972e-02	-3.325797e-01	-2.851561e-01
## 795	795	3.964482e-01	2.888376e-01	2.149738e-01
## 796	796	4.139189e-02	4.043995e-01	4.395039e-01
## 797	797	-1.377785e-01	-3.488145e-01	-2.652662e-01
## 798	798	-1.383865e-01	-1.015369e-01	-2.039251e-01
## 799	799	2.850786e-01	2.700950e-01	1.693612e-01
## 800	800	2.072218e-14	-1.246994e-01	-7.706405e-03
## 801	801	4.771570e-02	8.859126e-02	-4.151782e-02
## 802	802	-1.913350e-01	-3.672703e-01	-5.538081e-01
## 803	803	9.884906e-02	3.143792e-01	6.741161e-01
## 804	804	1.986760e-14	-2.734066e-02	-7.452861e-02
## 805	805	-1.349231e-01	-3.346695e-01	-2.330853e-01
## 806	806	-1.239174e-01	-3.499174e-01	-3.717300e-01
## 807	807	-1.700031e-01	-2.540020e-01	-2.455403e-01
## 808	808	8.042145e-02	1.297384e-01	3.396969e-01
## 809	809	1.346696e-01	5.343725e-01	5.517766e-01
## 810	810	7.760058e-02	3.448465e-01	1.659149e-01
## 811	811	5.857588e-02	-2.349286e-02	-1.139566e-02
## 812	812	1.915756e-14	-1.081191e-01	-7.987040e-02
## 813	813	1.278878e-01	1.457394e-02	-1.379236e-01
## 814	814	-2.645017e-02	-2.784089e-02	-3.015620e-03
## 815	815	9.785647e-02	-9.151715e-02	-2.245829e-01
## 816	816	-5.397576e-02	2.608245e-01	7.615112e-02
## 817	817	-2.573311e-02	2.096212e-01	-8.765510e-02
## 818	818	-4.778404e-02	2.909220e-01	1.141343e-01
## 819	819	1.173274e-01	-1.364237e-01	-9.248665e-02
## 820	820	5.242608e-02	1.545939e-01	2.953116e-01
## 821	821	1.927832e-01	1.418334e-01	-1.656454e-01
## 822	822	2.435457e-01	1.253946e-01	6.591243e-01
## 823	823	1.911851e-14	2.276013e-15	-1.450662e-01
## 824	824	2.169574e-02	4.590850e-02	1.438799e-01
## 825	825	1.551670e-01	2.275782e-01	2.260735e-02
## 826	826	-2.774102e-01	-2.310485e-01	-1.351414e-02
## 827	827	-1.164696e-01	-3.572220e-02	-1.558712e-01
## 828	828	-9.350870e-02	-7.108454e-02	-9.541792e-02
## 829	829	8.599197e-02	-1.935018e-02	-6.692578e-02
## 830	830	-1.195133e-01	-1.576027e-02	4.136135e-01
## 831	831	-9.825211e-02	-4.467937e-02	2.972295e-01
## 832	832	2.065421e-14	9.645781e-02	2.105941e-02
## 833	833	-1.750342e-01	-3.415677e-01	-3.346256e-02

## 834	834	-1.628000e-01	-2.446296e-01	-1.445423e-01
## 835	835	2.052423e-02	3.811515e-01	1.735548e-01
## 836	836	3.533170e-01	1.366896e-01	-3.995474e-02
## 837	837	3.475053e-01	1.114434e-01	-3.643396e-02
## 838	838	-4.102981e-02	-3.791082e-02	-1.040693e-01
## 839	839	-8.361306e-02	-1.685838e-01	-8.663303e-02
## 840	840	1.493805e-02	4.170421e-02	-7.298277e-02
## 841	841	4.422883e-02	1.483883e-01	4.077559e-01
## 842	842	-9.254095e-02	-1.451232e-01	-1.436242e-01
## 843	843	-9.884873e-02	-6.657532e-02	-5.187885e-02
## 844	844	7.760441e-03	2.576860e-01	9.035104e-02
## 845	845	-4.939001e-02	-8.109480e-02	-1.256749e-01
## 846	846	-3.902437e-02	2.216412e-01	2.680095e-01
## 847	847	8.191570e-02	1.104214e-01	5.566113e-02
## 848	848	-1.714910e-01	-2.350333e-01	-3.865480e-02
## 849	849	-1.329924e-01	-1.988917e-01	-2.451742e-01
## 850	850	3.382701e-01	3.627199e-01	4.604630e-01
## 851	851	2.772626e-01	4.570199e-01	3.735176e-01
## 852	852	-1.690288e-01	-2.491744e-01	-3.896140e-01
## 853	853	-9.968226e-02	-3.991024e-02	2.267433e-01
## 854	854	1.275615e-01	2.881225e-01	1.397329e-01
## 855	855	5.607412e-02	6.463531e-02	1.696183e-01
## 856	856	2.065814e-14	4.695032e-15	8.445534e-01
## 857	857	-1.183447e-01	-2.827862e-01	-7.988830e-02
## 858	858	-3.475081e-01	-2.283862e-01	-4.268572e-01
## 859	859	-2.423338e-01	-2.788213e-01	-1.616493e-01
## 860	860	-4.337563e-02	-1.607668e-01	-8.343358e-02
## 861	861	-2.723292e-01	-4.080252e-01	-3.218044e-01
## 862	862	-1.132062e-01	-1.218287e-01	6.076478e-03
## 863	863	-1.420301e-01	6.890820e-02	-8.765510e-02
## 864	864	8.471358e-02	-6.854249e-02	4.815775e-02
## 865	865	2.051746e-01	7.305323e-02	1.813936e-01
## 866	866	4.560938e-02	3.361013e-02	-4.882932e-02
## 867	867	-1.589765e-01	1.922775e-01	-1.971667e-01
## 868	868	5.666865e-02	3.708461e-01	3.940812e-01
## 869	869	1.731320e-01	3.919980e-02	-1.130121e-01
## 870	870	2.948373e-01	4.566878e-01	2.946995e-01
## 871	871	3.181131e-01	5.270875e-01	7.832136e-01
## 872	872	1.543236e-01	1.351182e-01	1.693612e-01
## 873	873	2.968103e-02	3.746800e-01	1.917790e-01
## 874	874	1.950873e-14	1.711292e-15	6.525793e-01
## 875	875	-2.766540e-01	-1.552630e-01	-3.095006e-01
## 876	876	-1.497871e-01	-9.523710e-02	1.607180e-01
## 877	877	-6.420771e-02	-6.116411e-02	-1.257236e-01
## 878	878	1.053655e-02	-2.749851e-01	-2.234690e-01
## 879	879	1.164120e-01	-2.328056e-01	-2.207263e-01
## 880	880	-3.681856e-02	9.203917e-02	-9.553968e-02
## 881	881	7.394158e-02	1.580334e-01	-1.158410e-02
## 882	882	-1.887684e-01	-6.127092e-02	2.688951e-01
## 883	883	1.295397e-01	2.179849e-01	3.958633e-02
## 884	884	-6.562747e-02	-6.223893e-02	-1.404956e-01
## 885	885	2.205472e-14	-3.156489e-01	-4.074312e-02
## 886	886	-3.267763e-01	-2.830632e-01	-1.220582e-01
## 887	887	-1.897317e-01	-1.509744e-01	-1.780875e-01

## 888	888	6.800327e-02	1.916240e-01	4.545757e-01
## 889	889	-1.854723e-01	-3.581046e-01	-4.080888e-01
## 890	890	7.667504e-02	-2.565400e-01	-3.583545e-01
## 891	891	1.808360e-01	3.680464e-01	5.974979e-01
## 892	892	-1.164134e-01	-3.778022e-01	2.449799e-01
## 893	893	1.482539e-01	4.019490e-01	1.470696e-01
## 894	894	-2.399634e-01	-2.473535e-01	-1.377309e-01
## 895	895	-1.145599e-01	2.125546e-01	2.372769e-01
## 896	896	-8.333558e-02	2.621072e-01	2.444965e-01
## 897	897	-1.240326e-01	-8.879621e-02	1.687056e-01
## 898	898	5.212873e-03	-1.061189e-01	-1.456446e-01
## 899	899	-3.699378e-02	-2.575375e-01	-1.095151e-01
## 900	900	-1.619529e-01	1.127412e-01	-2.033643e-01
## 901	901	-1.237244e-01	-2.014109e-01	-1.711528e-01
## 902	902	-2.192664e-02	7.097049e-02	-9.000383e-02
## 903	903	3.124215e-03	-2.149668e-01	-2.332839e-01
## 904	904	1.595318e-01	-2.978177e-03	5.511948e-02
## 905	905	1.795478e-01	-6.907825e-02	5.534904e-02
## 906	906	1.025772e-02	-1.640056e-01	-2.864540e-01
## 907	907	-9.001821e-02	-1.821119e-01	-1.728347e-01
## 908	908	1.648895e-02	-2.188489e-02	-1.182999e-01
## 909	909	-1.648898e-02	1.699089e-02	2.656901e-02
## 910	910	1.360402e-01	7.537713e-02	1.633861e-01
## 911	911	-3.450508e-02	-8.606122e-02	-1.126442e-02
## 912	912	-5.833976e-02	-1.705106e-01	-1.986289e-01
## 913	913	-1.515779e-01	-2.686083e-01	-2.543708e-01
## 914	914	-2.048357e-02	-7.278845e-02	3.094601e-03
## 915	915	1.530015e-01	1.861074e-04	-2.935533e-02
## 916	916	2.390994e-01	7.487283e-02	4.312545e-02
## 917	917	-1.263177e-01	-1.507842e-01	-2.163246e-01
## 918	918	-3.856056e-03	-9.136809e-02	-8.675513e-02
## 919	919	-1.893027e-02	3.420684e-02	-1.327817e-02
## 920	920	5.524673e-01	6.116424e-01	1.022243e+00
## 921	921	2.305590e-14	2.338341e-01	2.433764e-01
##	model2inv.residuals			
## 1		-9.280317e-02		
## 2		1.898734e-01		
## 3		-2.347236e-01		
## 4		-1.303840e-01		
## 5		-1.235915e-01		
## 6		-2.351678e-01		
## 7		-9.575475e-02		
## 8		9.057207e-02		
## 9		-6.849044e-02		
## 10		4.848579e-01		
## 11		6.218435e-02		
## 12		2.447512e-01		
## 13		2.710916e-01		
## 14		2.202923e-02		
## 15		-9.367233e-03		
## 16		-2.583605e-01		
## 17		-2.649770e-01		
## 18		2.738795e-02		
## 19		-3.473585e-01		

## 20	-2.829078e-01
## 21	6.986921e-02
## 22	-8.447318e-02
## 23	-4.933424e-01
## 24	-1.731369e-01
## 25	-3.000653e-02
## 26	9.345687e-01
## 27	3.516766e-01
## 28	-3.058291e-01
## 29	4.794199e-01
## 30	3.066528e-01
## 31	1.076493e-01
## 32	5.996625e-03
## 33	-1.844313e-01
## 34	1.016676e-01
## 35	-2.095070e-01
## 36	-1.329714e-01
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## 654	-2.461832e-01
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## 656	-4.976454e-02
## 657	-3.801305e-02
## 658	3.490447e-01
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## 661	-2.316304e-02
## 662	-1.454396e-01
## 663	2.284600e-01
## 664	3.312515e-01
## 665	-1.943253e-01
## 666	3.863894e-01
## 667	-1.706073e-02

## 668	-2.737249e-01
## 669	-1.730068e-02
## 670	-1.574612e-01
## 671	-6.791159e-02
## 672	2.378875e-01
## 673	-1.799813e-01
## 674	-2.110098e-01
## 675	-2.108277e-01
## 676	-2.731143e-01
## 677	1.708606e-01
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## 679	-8.308565e-02
## 680	-2.852651e-01
## 681	4.707081e-01
## 682	-5.025894e-02
## 683	-1.229701e-01
## 684	-2.482658e-01
## 685	2.201105e-01
## 686	-1.002717e-01
## 687	1.159411e-01
## 688	-1.688915e-01
## 689	-1.605374e-01
## 690	-3.111684e-01
## 691	-2.793982e-01
## 692	1.216781e-01
## 693	-1.499327e-01
## 694	-5.217283e-01
## 695	9.218132e-03
## 696	7.579884e-02
## 697	-2.614434e-02
## 698	-2.905829e-01
## 699	1.287867e-01
## 700	-9.185684e-02
## 701	6.836131e-02
## 702	-2.165284e-01
## 703	1.810800e-01
## 704	2.124455e-01
## 705	5.531190e-02
## 706	3.083958e-02
## 707	-2.134060e-01
## 708	-1.259362e-01
## 709	1.356623e-01
## 710	-2.497978e-01
## 711	-3.088828e-01
## 712	-2.586599e-01
## 713	-1.746885e-01
## 714	-1.548791e-01
## 715	2.566540e-01
## 716	5.194059e-01
## 717	-2.842249e-01
## 718	2.690918e-01
## 719	-2.239554e-01
## 720	-7.266431e-03
## 721	-1.793392e-01

## 722	3.940284e-01
## 723	5.575039e-01
## 724	-3.463887e-02
## 725	1.654403e-01
## 726	1.673166e-01
## 727	1.144378e+00
## 728	-5.211523e-02
## 729	-1.551770e-01
## 730	-1.286936e-01
## 731	1.743917e-01
## 732	2.458905e-02
## 733	-7.905403e-02
## 734	-3.183599e-01
## 735	-3.391822e-01
## 736	5.224537e-01
## 737	-2.681566e-01
## 738	-2.187761e-01
## 739	-2.395719e-01
## 740	9.269494e-02
## 741	-1.931651e-01
## 742	-2.267965e-02
## 743	-3.518587e-01
## 744	-2.245079e-01
## 745	-3.706971e-01
## 746	3.956272e-01
## 747	1.177222e+00
## 748	-1.880716e-02
## 749	5.212536e-02
## 750	-2.630522e-01
## 751	-1.057638e-01
## 752	1.372069e-01
## 753	-3.184013e-01
## 754	-1.648062e-01
## 755	-2.143091e-01
## 756	-4.200325e-01
## 757	3.768597e-01
## 758	2.447512e-01
## 759	8.222577e-02
## 760	-9.079109e-02
## 761	4.150454e-01
## 762	1.824771e-01
## 763	-2.034846e-01
## 764	-3.184013e-01
## 765	-3.514951e-02
## 766	9.841763e-03
## 767	-1.930039e-01
## 768	-9.548552e-02
## 769	-5.329331e-02
## 770	9.846358e-01
## 771	-2.334040e-01
## 772	8.469123e-02
## 773	-3.514951e-02
## 774	-2.947537e-01
## 775	-3.319128e-01

## 776	-1.888444e-01
## 777	-3.417538e-01
## 778	1.424827e-03
## 779	1.895618e-01
## 780	1.486488e-01
## 781	-3.204336e-01
## 782	-1.301153e-01
## 783	1.305735e-01
## 784	-4.335347e-01
## 785	-3.190480e-01
## 786	5.706765e-01
## 787	1.196379e+00
## 788	-6.342944e-03
## 789	1.803684e-01
## 790	-1.035983e-02
## 791	3.189800e-01
## 792	3.027934e-01
## 793	-2.073047e-01
## 794	-3.365545e-01
## 795	2.001093e-01
## 796	4.447021e-01
## 797	-2.992496e-01
## 798	-1.858504e-01
## 799	2.188279e-01
## 800	2.656964e-02
## 801	3.253570e-02
## 802	-6.366238e-01
## 803	5.877400e-01
## 804	-7.363426e-02
## 805	-2.156727e-01
## 806	-3.711229e-01
## 807	-2.775699e-01
## 808	2.418563e-02
## 809	4.858978e-01
## 810	6.987224e-02
## 811	3.294439e-03
## 812	-6.435479e-02
## 813	-2.341654e-01
## 814	6.019023e-03
## 815	-2.884582e-01
## 816	-1.249722e-02
## 817	-1.628099e-01
## 818	-1.024715e-02
## 819	-2.217451e-02
## 820	3.171537e-01
## 821	-1.872989e-01
## 822	5.479542e-01
## 823	-2.018867e-01
## 824	1.449853e-01
## 825	1.009639e-02
## 826	2.056129e-02
## 827	-1.172595e-01
## 828	-1.381091e-01
## 829	-6.602409e-02

## 830	4.860730e-01
## 831	2.847563e-01
## 832	-2.045259e-01
## 833	-1.045588e-01
## 834	-7.702796e-02
## 835	4.253966e-02
## 836	-7.370779e-03
## 837	-1.158081e-01
## 838	-3.020096e-01
## 839	-9.541530e-02
## 840	-4.502272e-02
## 841	3.995855e-01
## 842	-1.578336e-01
## 843	-2.917329e-01
## 844	5.329751e-04
## 845	-1.248300e-01
## 846	2.715803e-01
## 847	7.134765e-02
## 848	-5.460585e-02
## 849	-2.140657e-01
## 850	4.410827e-01
## 851	3.567134e-01
## 852	-3.664729e-01
## 853	1.905254e-01
## 854	1.408343e-01
## 855	2.093152e-01
## 856	9.391022e-01
## 857	-4.810558e-02
## 858	-4.431318e-01
## 859	-1.972404e-01
## 860	-4.638050e-02
## 861	-3.773085e-01
## 862	-7.626172e-02
## 863	-1.628099e-01
## 864	3.252821e-02
## 865	1.657166e-01
## 866	-1.462167e-01
## 867	-3.653559e-01
## 868	3.221534e-01
## 869	-1.860781e-01
## 870	3.386416e-01
## 871	7.637579e-01
## 872	2.188279e-01
## 873	9.360581e-02
## 874	6.748899e-01
## 875	-4.541564e-01
## 876	2.008118e-01
## 877	-3.188797e-01
## 878	-2.793029e-01
## 879	-4.178656e-01
## 880	-8.124667e-02
## 881	-9.300522e-02
## 882	9.330385e-02
## 883	-4.604998e-02

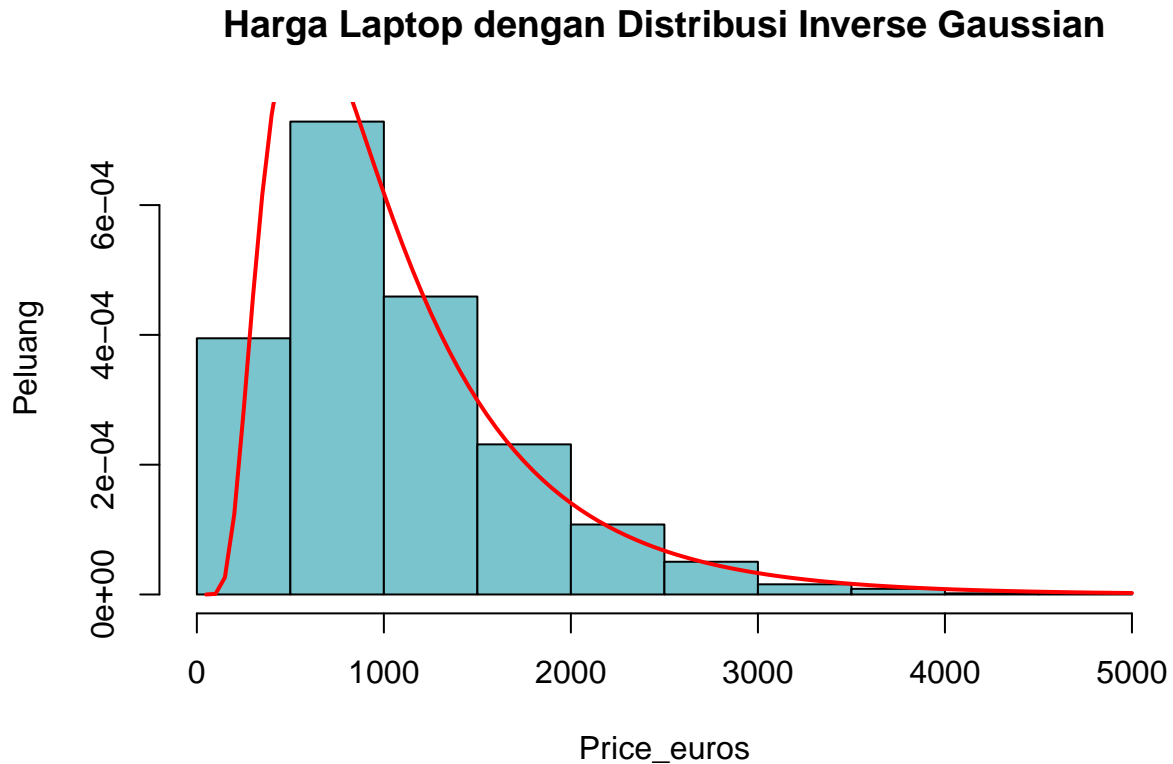
```
## 884      -1.327068e-01
## 885      -8.836346e-02
## 886      -1.476634e-01
## 887      -1.458029e-01
## 888       4.026863e-01
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## 891       5.800684e-01
## 892       2.082236e-01
## 893       9.837217e-02
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## 895       2.021440e-01
## 896       2.260349e-01
## 897       9.039613e-02
## 898      -1.166478e-01
## 899      -6.878308e-02
## 900      -3.793671e-01
## 901      -1.425225e-01
## 902      -1.915954e-01
## 903      -3.188798e-01
## 904       9.975346e-02
## 905       9.180316e-02
## 906      -3.452326e-01
## 907      -2.079510e-01
## 908      -1.656338e-01
## 909       9.459705e-02
## 910       1.739286e-01
## 911      -2.304526e-03
## 912      -2.823358e-01
## 913      -2.183989e-01
## 914       1.218461e-02
## 915      -1.021089e-01
## 916      -3.506078e-02
## 917      -2.147405e-01
## 918      -2.257531e-01
## 919      -1.049949e-02
## 920       1.036543e+00
## 921       3.560100e-01
```

```
summary(fitdist(data$Price_euros,"invgauss",method='mle',lower=c(0,0)
,start = list(mean = 1, shape = 5)))
```

```
## Warning in checkparamlist(arg_startfix$start.arg, arg_startfix$fix.arg, :
## Some parameter names have no starting/fixed value but have a default value:
## dispersion.
```

```
## Fitting of the distribution ' invgauss ' by maximum likelihood
## Parameters :
##      estimate Std. Error
## mean  1077.801         NA
## shape 2434.057         NA
## Loglikelihood: -8882.094   AIC:  17768.19   BIC:  17778.28
## Correlation matrix:
## [1] NA
```

```
h = hist(data$Price_euros,probability = T,main = paste("Harga Laptop dengan Distribusi Inverse Gaussian",
curve(dinvGauss(x,nu = 1077.554, #Mean
lambda = 2433.434 ), #Shape
add=TRUE,
lwd=2,
col="red"))
```



```
ks.test(data$Price_euros,rinvgauss(nrow(data),mean = 1077.554,shape = 2433.434),alternative = "two.sided")

## Warning in ks.test(data$Price_euros, rinvgauss(nrow(data), mean = 1077.554, :
## cannot compute correct p-values with ties

##
## Two-sample Kolmogorov-Smirnov test
##
## data: data$Price_euros and rinvgauss(nrow(data), mean = 1077.554, shape = 2433.434)
## D = 0.044348, p-value = 0.2081
## alternative hypothesis: two-sided
```