

# Factor.R

PRIYANSHI

2019-10-24

```
##Multivariate Project
##TELECOM-CHURN-ANALYSIS
##Author : Priyanshi Bajpai

##Importing Libraries

library(ggplot2)
library(dplyr)

## Warning: package 'dplyr' was built under R version 3.4.4

##
## 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 (stringr)

## Warning: package 'stringr' was built under R version 3.4.4

library(data.table)

## Warning: package 'data.table' was built under R version 3.4.4

##
## Attaching package: 'data.table'

## The following objects are masked from 'package:dplyr':
##
##   between, first, last

library(grid)
library(gridExtra)

##
## Attaching package: 'gridExtra'
```

```

## The following object is masked from 'package:dplyr':
##
##      combine

library(corrplot)

## Warning: package 'corrplot' was built under R version 3.4.4

## corrplot 0.84 loaded

library(psych)

## Warning: package 'psych' was built under R version 3.4.4

##
## Attaching package: 'psych'

## The following objects are masked from 'package:ggplot2':
##
##      %+%, alpha

##Importing Dataset and doing preliminary analysis

#Importing CSV file from drive on my Local computer and viewing it

tablechurn<-read.csv("C:/Users/SHIVANSHI/Desktop/Priyanshi/MVA/Telecom Churn
Analysis Data.csv")
tablechurn <- as.data.frame(tablechurn)
View(tablechurn)

#Checking the Dimension of the dataset

dim(tablechurn)

## [1] 7043    21

#Viewing the first 4 rows of the dataset to get the overview of the dataset

head(tablechurn,4)

##   CustomerID Gender SeniorCitizen Partner Dependents Tenure PhoneService
## 1 7590-VHVEG Female              0      Yes          No      1           No
## 2 5575-GNVDE  Male              0      No           No     34           Yes
## 3 3668-QPYBK  Male              0      No           No      2           Yes
## 4 7795-CFOCW  Male              0      No           No     45           No
##      MultipleLines InternetService OnlineSecurity OnlineBackup
## 1 No phone service          DSL              No          Yes
## 2                   No          DSL              Yes          No
## 3                   No          DSL              Yes          Yes
## 4 No phone service          DSL              Yes          No
##   DeviceProtection TechSupport StreamingTV StreamingMovies      Contract
## 1                   No          No          No          No Month-to-month

```

```

## 2          Yes          No          No          No          One year
## 3          No          No          No          No Month-to-month
## 4          Yes          Yes          No          No          One year
## PaperlessBilling          PaymentMethod MonthlyCharges TotalCharges
## 1          Yes          Electronic check          29.85          29.85
## 2          No          Mailed check          56.95          1889.50
## 3          Yes          Mailed check          53.85          108.15
## 4          No Bank transfer (automatic)          42.30          1840.75
## Churn
## 1 No
## 2 No
## 3 Yes
## 4 No

```

*#Gaining more insight about the kind of data stored in each column*

`summary(tablechurn)`

```

## CustomerID Gender SeniorCitizen Partner Dependents
## 0002-ORFBO: 1 Female:3488 Min. :0.0000 No :3641 No :4933
## 0003-MKNFE: 1 Male :3555 1st Qu.:0.0000 Yes:3402 Yes:2110
## 0004-TLHLJ: 1 Median :0.0000
## 0011-IGKFF: 1 Mean :0.1621
## 0013-EXCHZ: 1 3rd Qu.:0.0000
## 0013-MHZWF: 1 Max. :1.0000
## (Other) :7037
## Tenure PhoneService MultipleLines InternetService
## Min. : 0.00 No : 682 No :3390 DSL :2421
## 1st Qu.: 9.00 Yes:6361 No phone service: 682 Fiber optic:3096
## Median :29.00 Yes :2971 No :1526
## Mean :32.37
## 3rd Qu.:55.00
## Max. :72.00
##
## OnlineSecurity OnlineBackup
## No :3498 No :3088
## No internet service:1526 No internet service:1526
## Yes :2019 Yes :2429
##
##
## DeviceProtection TechSupport
## No :3095 No :3473
## No internet service:1526 No internet service:1526
## Yes :2422 Yes :2044
##
##
##
##

```

```

##           StreamingTV           StreamingMovies
## No           :2810   No           :2785
## No internet service:1526   No internet service:1526
## Yes           :2707   Yes           :2732
##
##
##
##           Contract   PaperlessBilling           PaymentMethod
## Month-to-month:3875   No :2872           Bank transfer (automatic):1544
## One year           :1473   Yes:4171           Credit card (automatic) :1522
## Two year           :1695           Electronic check           :2365
##                               Mailed check           :1612
##
##
##
## MonthlyCharges   TotalCharges   Churn
## Min.   : 18.25   Min.   : 18.8   No :5174
## 1st Qu.: 35.50   1st Qu.: 401.4   Yes:1869
## Median : 70.35   Median :1397.5
## Mean   : 64.76   Mean   :2283.3
## 3rd Qu.: 89.85   3rd Qu.:3794.7
## Max.   :118.75   Max.   :8684.8
##                               NA's   :11

```

`glimpse(tablechurn)`

```

## Observations: 7,043
## Variables: 21
## $ CustomerID      <fct> 7590-VHVEG, 5575-GNVDE, 3668-QPYBK, 7795-CFOC...
## $ Gender          <fct> Female, Male, Male, Male, Female, Female, Mal...
## $ SeniorCitizen    <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ...
## $ Partner          <fct> Yes, No, No, No, No, No, No, No, No, Yes, No, Yes...
## $ Dependents       <fct> No, No, No, No, No, No, Yes, No, No, Yes, Yes...
## $ Tenure           <int> 1, 34, 2, 45, 2, 8, 22, 10, 28, 62, 13, 16, 5...
## $ PhoneService     <fct> No, Yes, Yes, No, Yes, Yes, Yes, No, Yes, Yes...
## $ MultipleLines    <fct> No phone service, No, No, No phone service, N...
## $ InternetService  <fct> DSL, DSL, DSL, DSL, Fiber optic, Fiber optic,...
## $ OnlineSecurity   <fct> No, Yes, Yes, Yes, No, No, No, Yes, No, Yes, ...
## $ OnlineBackup     <fct> Yes, No, Yes, No, No, No, Yes, No, No, Yes, N...
## $ DeviceProtection <fct> No, Yes, No, Yes, No, Yes, No, No, Yes, No, N...
## $ TechSupport      <fct> No, No, No, Yes, No, No, No, No, Yes, No, No,...
## $ StreamingTV      <fct> No, No, No, No, No, Yes, Yes, No, Yes, No, No...
## $ StreamingMovies  <fct> No, No, No, No, No, Yes, No, No, Yes, No, No,...
## $ Contract         <fct> Month-to-month, One year, Month-to-month, One...
## $ PaperlessBilling <fct> Yes, No, Yes, No, Yes, Yes, Yes, No, Yes, No,...
## $ PaymentMethod    <fct> Electronic check, Mailed check, Mailed check,...
## $ MonthlyCharges   <dbl> 29.85, 56.95, 53.85, 42.30, 70.70, 99.65, 89....
## $ TotalCharges     <dbl> 29.85, 1889.50, 108.15, 1840.75, 151.65, 820....
## $ Churn            <fct> No, No, Yes, No, Yes, Yes, No, No, Yes, No, N...

```

*#The above results give us an insight that TotalCharges and MonthlyCharges are numerical values*

*#SeniorCitizen and Tenure are stored as numerical which need to be converted to categorical variables*

*## Performing Data Cleaning and Formatting*

*#Converting SeniorCitizen numerical variable into Categorical Variable*

```
tablechurn$SeniorCitizen<-factor(tablechurn$SeniorCitizen,levels = c(0,1),labels = c('no','yes'))
```

*#Converting tenure values into ranges of 12 months*

```
tablechurn <- mutate(tablechurn,Tenure_Range = Tenure)
cut(tablechurn$Tenure_Range,6,labels = c('0-1 Years','1-2 Years','2-3 Years','4-5 Years','5-6 Years','6-7 Years'))
```

```
##      [1] 0-1 Years 2-3 Years 0-1 Years 4-5 Years 0-1 Years 0-1 Years
##      [7] 1-2 Years 0-1 Years 2-3 Years 6-7 Years 1-2 Years 1-2 Years
##     [13] 5-6 Years 5-6 Years 2-3 Years 6-7 Years 5-6 Years 6-7 Years
##     [19] 0-1 Years 1-2 Years 0-1 Years 0-1 Years 0-1 Years 5-6 Years
##     [25] 5-6 Years 2-3 Years 4-5 Years 0-1 Years 6-7 Years 1-2 Years
##     [31] 6-7 Years 0-1 Years 2-3 Years 0-1 Years 0-1 Years 6-7 Years
##     [37] 0-1 Years 4-5 Years 2-3 Years 0-1 Years 0-1 Years 6-7 Years
##     [43] 1-2 Years 6-7 Years 1-2 Years 5-6 Years 0-1 Years 0-1 Years
##     [49] 5-6 Years 6-7 Years 4-5 Years 1-2 Years 2-3 Years 0-1 Years
##     [55] 5-6 Years 1-2 Years 6-7 Years 6-7 Years 2-3 Years 6-7 Years
##     [61] 4-5 Years 5-6 Years 6-7 Years 1-2 Years 0-1 Years 0-1 Years
##     [67] 4-5 Years 2-3 Years 5-6 Years 0-1 Years 0-1 Years 5-6 Years
##     [73] 6-7 Years 6-7 Years 0-1 Years 5-6 Years 4-5 Years 0-1 Years
##     [79] 2-3 Years 4-5 Years 0-1 Years 0-1 Years 0-1 Years 4-5 Years
##     [85] 5-6 Years 0-1 Years 2-3 Years 4-5 Years 4-5 Years 2-3 Years
##     [91] 2-3 Years 0-1 Years 6-7 Years 6-7 Years 6-7 Years 0-1 Years
##     [97] 6-7 Years 0-1 Years 5-6 Years 2-3 Years 0-1 Years 0-1 Years
##    [103] 4-5 Years 6-7 Years 6-7 Years 0-1 Years 6-7 Years 2-3 Years
##    [109] 4-5 Years 6-7 Years 5-6 Years 5-6 Years 4-5 Years 4-5 Years
##    [115] 6-7 Years 0-1 Years 2-3 Years 0-1 Years 4-5 Years 2-3 Years
##    [121] 5-6 Years 0-1 Years 0-1 Years 0-1 Years 0-1 Years 2-3 Years
##    [127] 2-3 Years 6-7 Years 0-1 Years 6-7 Years 1-2 Years 2-3 Years
##    [133] 6-7 Years 0-1 Years 0-1 Years 4-5 Years 1-2 Years 6-7 Years
##    [139] 5-6 Years 0-1 Years 6-7 Years 0-1 Years 6-7 Years 6-7 Years
##    [145] 6-7 Years 6-7 Years 0-1 Years 0-1 Years 2-3 Years 1-2 Years
##    [151] 0-1 Years 0-1 Years 6-7 Years 6-7 Years 0-1 Years 1-2 Years
##    [157] 1-2 Years 1-2 Years 1-2 Years 0-1 Years 1-2 Years 1-2 Years
##    [163] 0-1 Years 5-6 Years 0-1 Years 6-7 Years 0-1 Years 6-7 Years
##    [169] 5-6 Years 1-2 Years 4-5 Years 0-1 Years 1-2 Years 5-6 Years
##    [175] 2-3 Years 2-3 Years 1-2 Years 0-1 Years 1-2 Years 6-7 Years
##    [181] 0-1 Years 0-1 Years 0-1 Years 2-3 Years 1-2 Years 0-1 Years
##    [187] 1-2 Years 0-1 Years 1-2 Years 4-5 Years 4-5 Years 0-1 Years
```

## [193] 6-7 Years 6-7 Years 5-6 Years 1-2 Years 1-2 Years 5-6 Years  
## [199] 6-7 Years 0-1 Years 2-3 Years 1-2 Years 6-7 Years 1-2 Years  
## [205] 4-5 Years 2-3 Years 6-7 Years 0-1 Years 1-2 Years 6-7 Years  
## [211] 0-1 Years 0-1 Years 6-7 Years 2-3 Years 1-2 Years 5-6 Years  
## [217] 6-7 Years 6-7 Years 6-7 Years 0-1 Years 0-1 Years 6-7 Years  
## [223] 0-1 Years 0-1 Years 0-1 Years 1-2 Years 2-3 Years 0-1 Years  
## [229] 2-3 Years 4-5 Years 5-6 Years 5-6 Years 0-1 Years 6-7 Years  
## [235] 2-3 Years 0-1 Years 0-1 Years 1-2 Years 0-1 Years 1-2 Years  
## [241] 6-7 Years 6-7 Years 4-5 Years 6-7 Years 1-2 Years 0-1 Years  
## [247] 4-5 Years 1-2 Years 0-1 Years 4-5 Years 5-6 Years 0-1 Years  
## [253] 0-1 Years 2-3 Years 0-1 Years 6-7 Years 6-7 Years 5-6 Years  
## [259] 0-1 Years 2-3 Years 0-1 Years 1-2 Years 5-6 Years 2-3 Years  
## [265] 4-5 Years 6-7 Years 5-6 Years 1-2 Years 5-6 Years 6-7 Years  
## [271] 1-2 Years 5-6 Years 0-1 Years 1-2 Years 0-1 Years 0-1 Years  
## [277] 5-6 Years 1-2 Years 1-2 Years 0-1 Years 0-1 Years 0-1 Years  
## [283] 0-1 Years 6-7 Years 1-2 Years 1-2 Years 1-2 Years 0-1 Years  
## [289] 0-1 Years 0-1 Years 1-2 Years 2-3 Years 1-2 Years 0-1 Years  
## [295] 0-1 Years 0-1 Years 6-7 Years 2-3 Years 4-5 Years 0-1 Years  
## [301] 1-2 Years 0-1 Years 0-1 Years 6-7 Years 4-5 Years 5-6 Years  
## [307] 2-3 Years 2-3 Years 4-5 Years 4-5 Years 0-1 Years 1-2 Years  
## [313] 4-5 Years 0-1 Years 0-1 Years 5-6 Years 6-7 Years 4-5 Years  
## [319] 1-2 Years 2-3 Years 5-6 Years 6-7 Years 0-1 Years 0-1 Years  
## [325] 6-7 Years 5-6 Years 0-1 Years 0-1 Years 2-3 Years 1-2 Years  
## [331] 2-3 Years 0-1 Years 4-5 Years 0-1 Years 0-1 Years 6-7 Years  
## [337] 4-5 Years 6-7 Years 2-3 Years 6-7 Years 2-3 Years 6-7 Years  
## [343] 6-7 Years 6-7 Years 4-5 Years 0-1 Years 0-1 Years 6-7 Years  
## [349] 1-2 Years 6-7 Years 4-5 Years 1-2 Years 0-1 Years 0-1 Years  
## [355] 1-2 Years 0-1 Years 1-2 Years 6-7 Years 2-3 Years 4-5 Years  
## [361] 0-1 Years 4-5 Years 5-6 Years 4-5 Years 1-2 Years 0-1 Years  
## [367] 1-2 Years 0-1 Years 6-7 Years 6-7 Years 2-3 Years 0-1 Years  
## [373] 1-2 Years 5-6 Years 4-5 Years 4-5 Years 0-1 Years 2-3 Years  
## [379] 6-7 Years 1-2 Years 4-5 Years 0-1 Years 6-7 Years 0-1 Years  
## [385] 4-5 Years 0-1 Years 5-6 Years 4-5 Years 4-5 Years 0-1 Years  
## [391] 2-3 Years 2-3 Years 0-1 Years 1-2 Years 4-5 Years 6-7 Years  
## [397] 2-3 Years 2-3 Years 2-3 Years 1-2 Years 2-3 Years 0-1 Years  
## [403] 6-7 Years 6-7 Years 1-2 Years 6-7 Years 5-6 Years 2-3 Years  
## [409] 0-1 Years 0-1 Years 0-1 Years 4-5 Years 2-3 Years 5-6 Years  
## [415] 4-5 Years 1-2 Years 6-7 Years 4-5 Years 1-2 Years 0-1 Years  
## [421] 0-1 Years 0-1 Years 2-3 Years 4-5 Years 0-1 Years 5-6 Years  
## [427] 5-6 Years 0-1 Years 1-2 Years 6-7 Years 6-7 Years 6-7 Years  
## [433] 0-1 Years 0-1 Years 4-5 Years 2-3 Years 2-3 Years 6-7 Years  
## [439] 2-3 Years 0-1 Years 1-2 Years 5-6 Years 5-6 Years 1-2 Years  
## [445] 2-3 Years 5-6 Years 0-1 Years 5-6 Years 0-1 Years 6-7 Years  
## [451] 6-7 Years 1-2 Years 5-6 Years 2-3 Years 6-7 Years 1-2 Years  
## [457] 2-3 Years 2-3 Years 0-1 Years 0-1 Years 0-1 Years 1-2 Years  
## [463] 0-1 Years 0-1 Years 6-7 Years 6-7 Years 6-7 Years 6-7 Years  
## [469] 4-5 Years 1-2 Years 1-2 Years 0-1 Years 0-1 Years 1-2 Years  
## [475] 0-1 Years 1-2 Years 2-3 Years 0-1 Years 0-1 Years 1-2 Years  
## [481] 0-1 Years 4-5 Years 1-2 Years 6-7 Years 0-1 Years 6-7 Years  
## [487] 1-2 Years 6-7 Years 0-1 Years 0-1 Years 6-7 Years 0-1 Years

##	[493]	0-1 Years	6-7 Years	0-1 Years	1-2 Years	2-3 Years	6-7 Years
##	[499]	0-1 Years	0-1 Years	2-3 Years	6-7 Years	6-7 Years	5-6 Years
##	[505]	6-7 Years	1-2 Years	0-1 Years	0-1 Years	0-1 Years	0-1 Years
##	[511]	1-2 Years	6-7 Years	0-1 Years	5-6 Years	2-3 Years	4-5 Years
##	[517]	2-3 Years	0-1 Years	2-3 Years	0-1 Years	6-7 Years	2-3 Years
##	[523]	5-6 Years	1-2 Years	2-3 Years	5-6 Years	6-7 Years	5-6 Years
##	[529]	2-3 Years	5-6 Years	1-2 Years	6-7 Years	0-1 Years	6-7 Years
##	[535]	0-1 Years	0-1 Years	6-7 Years	2-3 Years	6-7 Years	5-6 Years
##	[541]	6-7 Years	0-1 Years	0-1 Years	0-1 Years	1-2 Years	2-3 Years
##	[547]	4-5 Years	6-7 Years	5-6 Years	1-2 Years	6-7 Years	6-7 Years
##	[553]	5-6 Years	1-2 Years	2-3 Years	5-6 Years	0-1 Years	4-5 Years
##	[559]	0-1 Years	0-1 Years	5-6 Years	0-1 Years	0-1 Years	5-6 Years
##	[565]	0-1 Years	6-7 Years	1-2 Years	6-7 Years	2-3 Years	0-1 Years
##	[571]	5-6 Years	4-5 Years	0-1 Years	5-6 Years	2-3 Years	6-7 Years
##	[577]	2-3 Years	0-1 Years	2-3 Years	0-1 Years	0-1 Years	0-1 Years
##	[583]	0-1 Years	0-1 Years	0-1 Years	0-1 Years	5-6 Years	0-1 Years
##	[589]	6-7 Years	6-7 Years	6-7 Years	4-5 Years	6-7 Years	2-3 Years
##	[595]	0-1 Years	0-1 Years	1-2 Years	0-1 Years	5-6 Years	6-7 Years
##	[601]	1-2 Years	0-1 Years	6-7 Years	4-5 Years	2-3 Years	6-7 Years
##	[607]	4-5 Years	5-6 Years	6-7 Years	6-7 Years	0-1 Years	0-1 Years
##	[613]	6-7 Years	4-5 Years	5-6 Years	1-2 Years	0-1 Years	6-7 Years
##	[619]	5-6 Years	0-1 Years	0-1 Years	6-7 Years	4-5 Years	1-2 Years
##	[625]	0-1 Years	2-3 Years	1-2 Years	6-7 Years	6-7 Years	5-6 Years
##	[631]	4-5 Years	4-5 Years	6-7 Years	0-1 Years	4-5 Years	6-7 Years
##	[637]	2-3 Years	6-7 Years	5-6 Years	0-1 Years	6-7 Years	4-5 Years
##	[643]	0-1 Years	5-6 Years	1-2 Years	1-2 Years	0-1 Years	5-6 Years
##	[649]	0-1 Years	1-2 Years	0-1 Years	0-1 Years	2-3 Years	1-2 Years
##	[655]	0-1 Years	0-1 Years	6-7 Years	4-5 Years	0-1 Years	4-5 Years
##	[661]	0-1 Years	0-1 Years	0-1 Years	6-7 Years	5-6 Years	0-1 Years
##	[667]	0-1 Years	5-6 Years	0-1 Years	6-7 Years	5-6 Years	5-6 Years
##	[673]	0-1 Years	1-2 Years	5-6 Years	6-7 Years	4-5 Years	0-1 Years
##	[679]	0-1 Years	4-5 Years	0-1 Years	6-7 Years	0-1 Years	4-5 Years
##	[685]	0-1 Years	0-1 Years	5-6 Years	0-1 Years	5-6 Years	5-6 Years
##	[691]	0-1 Years	2-3 Years	4-5 Years	0-1 Years	1-2 Years	0-1 Years
##	[697]	6-7 Years	0-1 Years	4-5 Years	6-7 Years	6-7 Years	2-3 Years
##	[703]	2-3 Years	0-1 Years	0-1 Years	2-3 Years	6-7 Years	2-3 Years
##	[709]	2-3 Years	2-3 Years	0-1 Years	1-2 Years	5-6 Years	1-2 Years
##	[715]	6-7 Years	4-5 Years	6-7 Years	2-3 Years	2-3 Years	6-7 Years
##	[721]	0-1 Years	6-7 Years	0-1 Years	0-1 Years	2-3 Years	0-1 Years
##	[727]	1-2 Years	0-1 Years	2-3 Years	6-7 Years	4-5 Years	0-1 Years
##	[733]	2-3 Years	6-7 Years	2-3 Years	2-3 Years	2-3 Years	6-7 Years
##	[739]	4-5 Years	6-7 Years	4-5 Years	0-1 Years	0-1 Years	6-7 Years
##	[745]	0-1 Years	6-7 Years	6-7 Years	0-1 Years	4-5 Years	6-7 Years
##	[751]	2-3 Years	6-7 Years	0-1 Years	0-1 Years	0-1 Years	1-2 Years
##	[757]	6-7 Years	0-1 Years	1-2 Years	6-7 Years	0-1 Years	1-2 Years
##	[763]	0-1 Years	6-7 Years	6-7 Years	0-1 Years	1-2 Years	1-2 Years
##	[769]	4-5 Years	1-2 Years	0-1 Years	1-2 Years	0-1 Years	0-1 Years
##	[775]	2-3 Years	6-7 Years	0-1 Years	0-1 Years	5-6 Years	0-1 Years
##	[781]	6-7 Years	0-1 Years	2-3 Years	0-1 Years	6-7 Years	4-5 Years
##	[787]	6-7 Years	2-3 Years	1-2 Years	6-7 Years	5-6 Years	6-7 Years

##	[793]	0-1 Years	2-3 Years	0-1 Years	0-1 Years	2-3 Years	1-2 Years
##	[799]	0-1 Years	6-7 Years	6-7 Years	0-1 Years	4-5 Years	4-5 Years
##	[805]	0-1 Years	6-7 Years	1-2 Years	6-7 Years	4-5 Years	0-1 Years
##	[811]	5-6 Years	6-7 Years	4-5 Years	2-3 Years	0-1 Years	2-3 Years
##	[817]	0-1 Years	5-6 Years	1-2 Years	6-7 Years	6-7 Years	4-5 Years
##	[823]	4-5 Years	0-1 Years	6-7 Years	1-2 Years	0-1 Years	1-2 Years
##	[829]	5-6 Years	2-3 Years	5-6 Years	4-5 Years	6-7 Years	4-5 Years
##	[835]	0-1 Years	5-6 Years	6-7 Years	0-1 Years	2-3 Years	4-5 Years
##	[841]	5-6 Years	6-7 Years	0-1 Years	1-2 Years	0-1 Years	1-2 Years
##	[847]	6-7 Years	0-1 Years	6-7 Years	6-7 Years	6-7 Years	5-6 Years
##	[853]	0-1 Years	0-1 Years	6-7 Years	6-7 Years	6-7 Years	0-1 Years
##	[859]	6-7 Years	6-7 Years	2-3 Years	6-7 Years	1-2 Years	0-1 Years
##	[865]	1-2 Years	0-1 Years	6-7 Years	0-1 Years	5-6 Years	0-1 Years
##	[871]	6-7 Years	5-6 Years	6-7 Years	5-6 Years	4-5 Years	0-1 Years
##	[877]	1-2 Years	5-6 Years	5-6 Years	2-3 Years	0-1 Years	2-3 Years
##	[883]	0-1 Years	6-7 Years	5-6 Years	0-1 Years	0-1 Years	2-3 Years
##	[889]	4-5 Years	6-7 Years	2-3 Years	5-6 Years	2-3 Years	0-1 Years
##	[895]	6-7 Years	2-3 Years	6-7 Years	5-6 Years	0-1 Years	5-6 Years
##	[901]	0-1 Years	0-1 Years	1-2 Years	5-6 Years	6-7 Years	0-1 Years
##	[907]	0-1 Years	1-2 Years	0-1 Years	6-7 Years	0-1 Years	1-2 Years
##	[913]	6-7 Years	0-1 Years	6-7 Years	0-1 Years	1-2 Years	6-7 Years
##	[919]	2-3 Years	1-2 Years	5-6 Years	0-1 Years	1-2 Years	6-7 Years
##	[925]	1-2 Years	2-3 Years	0-1 Years	1-2 Years	6-7 Years	2-3 Years
##	[931]	1-2 Years	2-3 Years	6-7 Years	0-1 Years	0-1 Years	0-1 Years
##	[937]	0-1 Years	0-1 Years	6-7 Years	1-2 Years	1-2 Years	1-2 Years
##	[943]	1-2 Years	6-7 Years	5-6 Years	0-1 Years	0-1 Years	2-3 Years
##	[949]	2-3 Years	2-3 Years	0-1 Years	0-1 Years	1-2 Years	1-2 Years
##	[955]	1-2 Years	0-1 Years	6-7 Years	0-1 Years	2-3 Years	2-3 Years
##	[961]	0-1 Years	1-2 Years	0-1 Years	5-6 Years	0-1 Years	0-1 Years
##	[967]	0-1 Years	0-1 Years	6-7 Years	0-1 Years	0-1 Years	5-6 Years
##	[973]	5-6 Years	4-5 Years	5-6 Years	6-7 Years	0-1 Years	0-1 Years
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##	[985]	6-7 Years	2-3 Years	0-1 Years	0-1 Years	2-3 Years	2-3 Years
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##	[997]	2-3 Years	0-1 Years	6-7 Years	0-1 Years	0-1 Years	2-3 Years
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```
tablechurn$Tenure_Range <- cut(tablechurn$Tenure_Range,6,labels = c('0-1 Year
s','1-2 Years','2-3 Years','4-5 Years','5-6 Years','6-7 Years'))
```

```
#Checking if there are any NULL values in any of the columns
table(is.na(tablechurn))
```

```
##
## FALSE TRUE
## 154935 11

str_detect(tablechurn, 'NA')

## Warning in stri_detect_regex(string, pattern, negate = negate, opts_regex
=
## opts(pattern)): argument is not an atomic vector; coercing
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE

setDT(tablechurn)
tablechurn[is.na(TotalCharges), NROW(TotalCharges)]

## [1] 11

#There are 11 rows out of 7043 rows that have null values.Hence removing these rows since they are only 0.15% of total so we can afford to drop them

tablechurn <- tablechurn[complete.cases(tablechurn), ]

#Replacing 'No Internet Service' values in OnlineSecurity,OnlineBackup Device Protection,TechSupport,StreamingTV and StreamingMovies columns with 'No'

tablechurn$OnlineSecurity[tablechurn$OnlineSecurity=='No internet service'] <- 'No'
tablechurn$OnlineBackup[tablechurn$OnlineBackup=='No internet service'] <- 'No'
tablechurn$DeviceProtection[tablechurn$DeviceProtection=='No internet service'] <- 'No'
tablechurn$TechSupport[tablechurn$TechSupport=='No internet service'] <- 'No'
tablechurn$StreamingTV[tablechurn$StreamingTV=='No internet service'] <- 'No'
tablechurn$StreamingMovies[tablechurn$StreamingMovies=='No internet service'] <- 'No'

#Deleting the unused levels from the factor variables

tablechurn$OnlineSecurity <- factor(tablechurn$OnlineSecurity)
tablechurn$OnlineBackup <- factor(tablechurn$OnlineBackup)
tablechurn$DeviceProtection <- factor(tablechurn$DeviceProtection)
tablechurn$TechSupport <- factor(tablechurn$TechSupport)
tablechurn$StreamingTV <- factor(tablechurn$StreamingTV)

library(data.table)

##-----Factor Analysis-----
-----

## Creating new data frame for numerical values for doing Factor Analysis
```

```
tablechurnFA = data.frame(tablechurn$MonthlyCharges,tablechurn$TotalCharges,t
ablechurn$Tenure)
setDT(tablechurnFA)
```

*##Setting column names for our new dataframe*

```
names(tablechurnFA) <- c('MonthlyCharges','TotalCharges','Tenure')
```

*##head(tablechurnFA)*

```
tablechurnFA
```

```
##      MonthlyCharges TotalCharges Tenure
##  1:          29.85         29.85      1
##  2:          56.95        1889.50     34
##  3:          53.85         108.15      2
##  4:          42.30        1840.75     45
##  5:          70.70         151.65      2
##  ---
## 7028:          84.80        1990.50     24
## 7029:         103.20        7362.90     72
## 7030:          29.60         346.45     11
## 7031:          74.40         306.60      4
## 7032:         105.65        6844.50     66
```

```
library(psych)
```

*##Since we have 3 columns that we are considering for factor analysis , we are checking*

*#how will the variance be distributed across 3 factors and if we really need 3 factors*

*#for our analysis.*

```
fit.pc <- principal(tablechurnFA, nfactors=3, rotate="varimax")
fit.pc
```

*## Principal Components Analysis*

*## Call: principal(r = tablechurnFA, nfactors = 3, rotate = "varimax")*

*## Standardized loadings (pattern matrix) based upon correlation matrix*

```
##           RC1  RC2  RC3 h2      u2 com
## MonthlyCharges 0.15 0.98 0.09 1  0.0e+00 1.1
## TotalCharges   0.77 0.51 0.39 1 -1.3e-15 2.3
## Tenure          0.99 0.10 0.04 1 -2.0e-15 1.0
##
```

```
##           RC1  RC2  RC3
## SS loadings    1.60 1.24 0.16
## Proportion Var  0.53 0.41 0.05
## Cumulative Var  0.53 0.95 1.00
## Proportion Explained 0.53 0.41 0.05
## Cumulative Proportion 0.53 0.95 1.00
##
```

```
## Mean item complexity = 1.5
## Test of the hypothesis that 3 components are sufficient.
##
## The root mean square of the residuals (RMSR) is 0
## with the empirical chi square 0 with prob < NA
##
## Fit based upon off diagonal values = 1
```

```
round(fit.pc$values, 3)
```

```
## [1] 2.180 0.761 0.059
```

```
fit.pc$loadings
```

```
##
## Loadings:
##           RC1   RC2   RC3
## MonthlyCharges 0.151 0.985
## TotalCharges   0.767 0.509 0.391
## Tenure          0.995
##
##           RC1   RC2   RC3
## SS loadings    1.600 1.238 0.162
## Proportion Var 0.533 0.413 0.054
## Cumulative Var 0.533 0.946 1.000
```

```
# Loadings with more digits
```

```
for (i in c(1,2,3)) { print(fit.pc$loadings[[1,i]])}
```

```
## [1] 0.150739
## [1] 0.984762
## [1] 0.08672656
```

```
# Communalities
```

```
fit.pc$communality
```

```
## MonthlyCharges   TotalCharges      Tenure
##           1           1           1
```

```
# Rotated factor scores, Notice the columns ordering
```

```
fit.pc$scores
```

```
##           RC1           RC2           RC3
## [1,] -1.2311067538 -1.1068588544 1.313981e+00
## [2,] 0.1006912229 -0.2527791841 -3.125931e-01
## [3,] -1.2355277231 -0.2006592146 2.299921e-01
## [4,] 0.6167293819 -0.7944116945 -6.740261e-01
## [5,] -1.2692030906 0.4361767857 -4.848300e-01
## [6,] -1.0860264883 1.4689688002 -1.435217e+00
## [7,] -0.4931440465 0.9531244022 -6.517006e-01
## [8,] -0.8441184221 -1.1326139027 8.954768e-01
## [9,] -0.3023273640 1.4328381797 -4.133605e-01
```

```
## [10,] 1.2749111148 -0.4366656911 -5.721077e-01
## [11,] -0.7613759229 -0.3926387040 9.107749e-02
## [12,] -0.5594245132 -1.5408678629 8.971746e-01
## [13,] 0.9249512291 0.9945523412 7.246874e-01
## [14,] 0.5470104933 1.1862868451 4.883715e-01
## [15,] -0.4216029521 1.4973027366 -6.697538e-01
## [16,] 1.2965533840 1.2460438599 2.167117e+00
## [17,] 1.0005407110 -1.5195233901 -1.405028e+00
## [18,] 1.4182909366 1.0566067916 1.596247e+00
## [19,] -0.9015365077 -0.1889436375 3.384503e-02
## [20,] -0.5356255381 0.9981156178 -7.246407e-01
## [21,] -1.2500603518 -0.7347188562 8.772166e-01
## [22,] -0.7327960606 -1.4983282952 1.041247e+00
## [23,] -1.2123465599 -1.4752015057 1.746289e+00
## [24,] 1.0902706049 -0.2997161385 -3.690255e-01
## [25,] 0.7147544860 -0.2594507270 -2.885234e-01
## [26,] -0.0583904122 -0.2789263398 -3.715634e-01
## [27,] 0.4785354110 1.0511500856 4.746937e-01
## [28,] -1.2317836680 -1.0935681402 1.298383e+00
## [29,] 1.5349472715 0.5457201139 8.900128e-01
## [30,] -0.6330804484 0.1158308365 -2.525191e-01
## [31,] 1.4629780341 0.7320657166 1.237021e+00
## [32,] -1.3173793530 1.3773301477 -1.583059e+00
## [33,] -0.2255855023 0.0924375126 -1.394434e-01
## [34,] -1.2124432619 -1.4733028323 1.744061e+00
## [35,] -1.2608909792 -0.5220674286 6.276368e-01
## [36,] 1.4806992725 0.8133800146 1.643455e+00
## [37,] -1.1414176463 0.3823332110 -4.788022e-01
## [38,] 0.5297751070 0.2510828403 6.140810e-02
## [39,] -0.0605202331 1.4408079501 -3.300998e-01
## [40,] -0.9616057458 1.3711107154 -1.230167e+00
## [41,] -0.8886925248 -0.3981730285 2.219064e-01
## [42,] 1.5474312370 -0.0884898086 2.193098e-03
## [43,] -0.5223513490 -1.4816810926 8.505371e-01
## [44,] 1.2182400473 0.3114827607 1.143816e-01
## [45,] -0.8271412830 0.5625331363 -5.800428e-01
## [46,] 0.6294260311 0.5829008424 -1.619800e-01
## [47,] -1.2263640282 -0.3745956697 4.261203e-01
## [48,] -1.2877351861 0.8159882594 -9.519477e-01
## [49,] 0.7583634604 0.3697210512 2.140822e-01
## [50,] 1.5379940012 -0.2118210395 -5.164234e-01
## [51,] 0.3560486621 0.8036906338 9.849758e-03
## [52,] -0.8002212497 1.3863137309 -1.204231e+00
## [53,] -0.3153816425 0.2318494459 -2.824702e-01
## [54,] -1.0424205440 0.7665142350 -8.165608e-01
## [55,] 1.1115952173 0.1639588830 5.858612e-02
## [56,] -0.6739801441 1.2133255238 -8.582730e-01
## [57,] 1.1216328804 0.9014776766 1.171403e+00
## [58,] 1.2064005305 1.1529708868 1.541029e+00
## [59,] 0.2018596849 -1.3588896038 -1.928265e-01
```



```
## [60,] 1.4417610143 1.0346883789 2.110934e+00
## [61,] 0.4780729543 1.0997101002 3.648478e-01
## [62,] 1.0425521878 0.6245963734 7.160810e-01
## [63,] 1.7650631154 -0.9024075047 -1.520320e+00
## [64,] -0.5638234496 -0.2600823299 -5.196865e-02
## [65,] -1.0333751774 1.2658369069 -1.232280e+00
## [66,] -1.2374718364 0.6018930416 -6.586989e-01
## [67,] 0.5620615050 0.3966689750 -7.647803e-02
## [68,] -0.0988468062 0.5229032117 -2.461443e-01
## [69,] 0.9168204238 -1.5301130550 -1.330897e+00
## [70,] -0.9628453554 0.7092517525 -6.112676e-01
## [71,] -1.2682403335 -0.3777682457 4.582790e-01
## [72,] 0.9982532295 -1.5367091458 -1.301725e+00
## [73,] 1.1110923915 1.2684127919 1.603107e+00
## [74,] 1.4194492598 -1.4180458159 -1.905683e+00
## [75,] -1.2143046035 0.1981078230 -2.531844e-01
## [76,] 0.7986204403 1.3272712019 1.056311e+00
## [77,] 0.6010793023 -0.3809815909 -2.248307e-01
## [78,] -0.9870359665 -0.2066394793 1.725956e-01
## [79,] -0.1188951993 0.3961204333 -4.771751e-01
## [80,] 0.6732316087 -1.3483752798 -7.674150e-01
## [81,] -1.3268417640 0.7728278713 -8.921264e-01
## [82,] -0.8500313482 -0.3692518270 2.095668e-01
## [83,] -1.0706555887 0.5714954009 -6.609703e-01
## [84,] 0.2662534698 1.2634518692 1.384864e-01
## [85,] 0.8708789668 -1.5359021722 -1.185312e+00
## [86,] -1.0451601165 1.4454994125 -1.373895e+00
## [87,] 0.1217644230 -0.0906446633 -1.973165e-01
## [88,] 0.8223107491 -1.5273120633 -1.006809e+00
## [89,] 0.7405126319 -1.5412341936 -9.748292e-01
## [90,] -0.0405404142 -1.0416574408 -1.004399e-03
## [91,] -0.1514298811 0.6222026590 -1.900078e-01
## [92,] -1.3178484752 0.5962512395 -6.848860e-01
## [93,] 1.3082370050 0.3759503701 8.164355e-01
## [94,] 1.1560177979 1.2475429646 1.551206e+00
## [95,] 1.4703503075 0.8279933024 1.878763e+00
## [96,] -0.8743519114 0.6724124746 -6.917017e-01
## [97,] 1.6011331815 -0.1630120038 -1.456029e-01
## [98,] -1.0410301601 -1.4475969672 1.480008e+00
## [99,] 0.9964423664 -1.5157307095 -1.306832e+00
## [100,] -0.4013543416 1.2501165978 -5.809608e-01
## [101,] -1.2124432619 -1.4733028323 1.744061e+00
## [102,] -1.2109927315 -1.5017829342 1.777487e+00
## [103,] 0.1355117388 1.0060789765 -8.446909e-02
## [104,] 1.4906083685 -0.7842961865 -1.062204e+00
## [105,] 1.2700490643 1.1533500955 2.020135e+00
## [106,] -1.0466266124 -1.3222700007 1.312240e+00
## [107,] 1.4705588685 0.9694352280 1.517924e+00
## [108,] 0.1022340169 -1.1665813239 -2.103805e-01
## [109,] 0.3449199154 0.9505008000 -6.647533e-02
```

```
## [110,] 1.8732369378 -1.5859859974 -2.646253e+00
## [111,] 0.8171687669 0.9045497744 5.542788e-01
## [112,] 0.8475753109 -0.3274884654 -3.791893e-01
## [113,] 0.3486941400 0.8439535989 1.020071e-01
## [114,] 0.1563998195 0.3839761824 -1.470787e-01
## [115,] 1.3688946349 -0.4864368791 -7.643583e-01
## [116,] -1.2651941337 1.1555673862 -1.321063e+00
## [117,] 0.2692685313 -1.1508634781 -3.342490e-01
## [118,] -1.0086981441 1.4661484091 -1.307645e+00
## [119,] 0.5218852982 -1.5090816596 -6.916433e-01
## [120,] -0.2729542582 0.7866134782 -6.383953e-01
## [121,] 0.8443270028 0.9903903481 7.012903e-01
## [122,] -0.9961123091 -1.4598192793 1.406580e+00
## [123,] -1.2351745547 0.5692621894 -6.371015e-01
## [124,] -1.0183890747 -0.3431333957 2.631070e-01
## [125,] -1.0827841258 -1.4504299233 1.508097e+00
## [126,] -0.0505170722 0.8361648553 -1.504650e-01
## [127,] -0.2587608880 0.5161163724 -3.318743e-01
## [128,] 1.8506706097 -1.4687599126 -2.347615e+00
## [129,] -1.2115729437 -1.4903908934 1.764117e+00
## [130,] 1.6519524005 -0.4726971758 -7.033360e-01
## [131,] -0.8551512188 0.9073652402 -7.101539e-01
## [132,] -0.2845501349 -0.1549936709 -1.209761e-01
## [133,] 1.5158568259 -0.6192394666 -1.064015e+00
## [134,] -1.2419373812 -0.8942074269 1.064402e+00
## [135,] -1.2164447677 -0.5594373773 6.297867e-01
## [136,] 0.5863477051 -1.3547445418 -6.207312e-01
## [137,] -0.4152694398 0.4364327780 -3.239738e-01
## [138,] 1.5215261923 -1.5537054697 -2.094884e+00
## [139,] 1.2175612866 -1.5713062079 -1.596662e+00
## [140,] -1.3096288026 0.4348639954 -4.954727e-01
## [141,] 1.5368206169 0.4555672163 1.067271e+00
## [142,] -1.0215942496 0.4125756544 -4.747488e-01
## [143,] 1.0444247255 0.9913166113 8.220481e-01
## [144,] 1.2365879201 0.4335448240 4.019708e-01
## [145,] 1.8043878030 -1.4581596522 -2.234234e+00
## [146,] 1.2068872652 0.8686493693 1.166031e+00
## [147,] -1.1245646930 -1.4988462950 1.651410e+00
## [148,] -1.2616645955 -0.5068780410 6.098096e-01
## [149,] -0.0920938487 0.0262620228 -2.524206e-01
## [150,] -0.7297038807 0.2991364693 -3.263687e-01
## [151,] -1.0167003175 0.3134710527 -3.543966e-01
## [152,] -1.1147045006 1.3095613492 -1.357453e+00
## [153,] 1.3489757586 1.0487777969 2.361335e+00
## [154,] 1.1477689008 0.5084884930 3.952296e-01
## [155,] -0.9942496332 -1.4979908601 1.453521e+00
## [156,] -0.7988168859 0.7231260592 -6.514906e-01
## [157,] -0.4785750125 0.7790235378 -5.972386e-01
## [158,] -0.3002309199 -1.4998024033 4.402834e-01
## [159,] -0.6736209445 0.1055309111 -2.375655e-01
```

```
## [160,] -0.8343994890 -1.2811706478 1.013247e+00
## [161,] -0.7800522639 -0.1822632039 5.344004e-02
## [162,] -0.5543194538 0.7363970957 -6.522632e-01
## [163,] -1.2666390012 0.3999523584 -4.612173e-01
## [164,] 0.8242338007 0.1772802673 4.269729e-02
## [165,] -0.7798117038 -1.4724254405 1.135444e+00
## [166,] 1.7396510958 -1.5699157922 -2.404916e+00
## [167,] -1.1861096752 0.4320234945 -5.054443e-01
## [168,] 1.5419088685 0.5130348617 7.891454e-01
## [169,] 1.1527341355 -0.7591144915 -8.566916e-01
## [170,] -0.5619495300 -1.4850308673 8.232605e-01
## [171,] 0.3796217951 0.6090759550 -1.208221e-01
## [172,] -1.3367230622 1.7093789789 -1.908846e+00
## [173,] -0.8019853867 0.7598397378 -6.604456e-01
## [174,] 0.7420794114 0.8572405110 4.938004e-01
## [175,] 0.1315463002 -1.5012966898 -1.399187e-01
## [176,] 0.2069859823 -1.3554944000 -3.361012e-01
## [177,] -0.7421054652 0.4792542643 -4.529189e-01
## [178,] -1.0733900527 0.6202495952 -7.115844e-01
## [179,] -0.8174717340 1.6093159581 -1.311070e+00
## [180,] 1.3892825768 -1.5404105547 -1.881855e+00
## [181,] -1.2313001579 -1.1030615075 1.309525e+00
## [182,] -1.2609876812 -0.5201687552 6.254084e-01
## [183,] -1.0509064868 0.9098253232 -9.535609e-01
## [184,] -0.0002108562 0.3603542683 -2.773425e-01
## [185,] -0.8382252662 0.6639579985 -5.435190e-01
## [186,] -1.2213398487 -1.2986248739 1.539049e+00
## [187,] -0.4732023236 -0.3646972331 -1.805016e-02
## [188,] -1.1458601302 -1.0898648935 1.183640e+00
## [189,] -0.6900369028 -1.5078747402 1.017837e+00
## [190,] 0.3466501553 -0.3156344881 -1.605224e-01
## [191,] 0.4179249166 0.1801278029 -4.993511e-02
## [192,] -1.1462647167 1.1703253702 -1.254608e+00
## [193,] 1.7394477656 -1.5769816124 -2.381820e+00
## [194,] 1.4263569108 1.0872793273 2.383702e+00
## [195,] 1.3056466947 -1.5832727425 -1.728861e+00
## [196,] -0.5937223045 1.2403087577 -8.825812e-01
## [197,] -0.2261192228 -1.3663551448 3.100476e-01
## [198,] 0.9141356820 1.3195485590 1.268987e+00
## [199,] 1.4251034507 1.1943229089 2.147714e+00
## [200,] -1.2135069843 -1.4524174242 1.719549e+00
## [201,] -0.3261666883 1.3627124103 -6.870912e-01
## [202,] -0.7955560299 0.6953372520 -6.673859e-01
## [203,] 1.4195200547 1.0101750610 1.680594e+00
## [204,] -0.8332580733 0.6365718091 -6.052769e-01
## [205,] 0.4766529161 0.0892184334 -2.886699e-01
## [206,] -0.0194983890 0.5321919948 -2.020930e-01
## [207,] 1.6901508370 -0.5317454535 -4.824991e-01
## [208,] -1.3279054863 0.7937132794 -9.166387e-01
## [209,] -0.6582975064 1.6183831760 -1.211623e+00
```

```
## [210,] 1.1465586877 0.9702853236 1.419887e+00
## [211,] -1.2197011825 -0.4969622836 5.584199e-01
## [212,] -1.2222101670 -1.2815368128 1.518993e+00
## [213,] 1.3960088517 -1.5564120922 -2.018453e+00
## [214,] 0.0046258321 -1.5122326975 -5.931055e-03
## [215,] -0.4456578223 0.8635142305 -5.982097e-01
## [216,] 1.0509962605 -0.3368408865 -3.199584e-01
## [217,] 1.7518486846 -0.8025626090 -1.423828e+00
## [218,] 1.4386156218 -0.4496961860 -5.362200e-01
## [219,] 1.2795419520 0.4267064796 3.666355e-01
## [220,] -1.0408351397 0.7427427931 -7.985100e-01
## [221,] -1.1845001033 0.4039848983 -4.773080e-01
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## [789,] 1.1753156055 -0.3092873595 -4.273252e-01
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## [1062,] -0.7365217976 -0.1961698314 2.071135e-02
## [1063,] -0.4597201738 0.9653395072 -4.844056e-01
## [1064,] 0.7834150884 -1.5568842027 -9.866706e-01
## [1065,] -0.4156427197 0.9312801171 -4.808803e-01
## [1066,] 0.5632585195 1.0298496670 4.543232e-01
## [1067,] -0.4786744918 -0.2845348178 -7.561334e-02
## [1068,] -1.2671149559 0.4007982105 -4.508319e-01
## [1069,] -1.2257447748 -0.3815450860 4.273029e-01
## [1070,] -0.4056124016 -0.2060122475 -4.026818e-02
## [1071,] -1.1228237879 1.4192163310 -1.419533e+00
## [1072,] -1.2141838985 -1.4391267100 1.703950e+00
## [1073,] 0.9802568659 0.8659697596 6.705590e-01
## [1074,] 1.2391453732 -1.4207561791 -1.465709e+00
## [1075,] 0.1936312946 1.6473601440 6.302745e-03
## [1076,] 1.0536846797 0.3134827415 1.285717e-01
## [1077,] -1.2247953512 0.3878644253 -4.541773e-01
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## [1079,] 0.4427853789 1.0519815662 3.357637e-01
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## [1083,] -0.9438226727 1.0672363283 -9.341444e-01
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## [1089,] 1.5697138448 -0.2108377575 -2.761194e-01
## [1090,] 1.4391993745 0.8437591961 1.581425e+00
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## [1093,] -1.0855973637 0.7944053343 -8.282621e-01
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## [1103,] 1.1281714420 0.8242756138 1.193499e+00
## [1104,] 1.7200643371 -1.4357498089 -2.227156e+00
## [1105,] 1.7179234259 -1.4265232116 -2.194063e+00
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## [1116,] 1.5954652545 -0.3755671038 -5.391308e-01
## [1117,] -0.5278552636 0.2962547993 -2.420661e-01
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## [1131,] -0.3076859149 0.6710802827 -5.117402e-01
## [1132,] 1.4086396714 1.2526406423 2.433947e+00
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## [1143,] -0.0466263508 -0.9783687285 -4.142448e-05
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## [1184,]  1.4220316680  0.9521337342  1.760399e+00
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## [1203,] -1.2256866284  0.4113956704 -4.898697e-01
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## [1210,] 1.7370767484 -1.5640595541 -2.351963e+00
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## [1233,] -1.2399554728 0.6665134002 -7.557679e-01
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## [1240,] -1.2609876812 -0.5201687552 6.254084e-01
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## [1255,] 0.7794874501 -1.5461162671 -9.104859e-01
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## [1257,] -1.2281786375 -0.3341235321 3.721356e-01
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## [1599,] -0.7173876338 0.1231160186 -2.078695e-01
## [1600,] 1.3861206974 0.7361936439 1.093783e+00
## [1601,] 1.5693772534 -1.5707878019 -2.233201e+00
## [1602,] 1.4647547245 0.9511555598 1.716412e+00
## [1603,] -0.8591322196 1.0306754007 -9.153162e-01
## [1604,] -0.5154625237 -1.4907300165 6.921989e-01
## [1605,] 0.5926736360 1.4097952713 8.796369e-01
## [1606,] 0.7953073790 -0.2403169018 -3.008664e-01
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## [1608,] 1.3376687497 0.4832721554 8.497187e-01
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## [1612,] 1.0435534789 -1.5760424944 -1.317090e+00
## [1613,] -0.2021837077 -0.1329925214 -1.881916e-01
## [1614,] -0.4736670462 1.1303319067 -5.323371e-01
## [1615,] 1.4521667703 0.3019104343 4.488512e-01
## [1616,] -1.1859894133 -1.1380314762 1.282921e+00
## [1617,] 0.0425776526 0.7427510105 -2.097064e-01
## [1618,] 0.5506642132 0.1270335951 -1.760019e-01
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## [1620,] 0.8475510940 0.9321597675 7.628429e-01
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## [1623,] -0.9103022855 0.5621645584 -5.462913e-01
## [1624,] -0.1689004192 0.9204432893 -4.800909e-01
## [1625,] 1.4610354108 -0.0089863766 -7.969757e-02
## [1626,] 0.1046642050 1.2498475297 1.139167e-01
## [1627,] -0.6872791045 0.8603946284 -6.985410e-01
## [1628,] 0.4963600520 1.2714472631 5.292315e-01
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## [1632,] 0.8121778690 -1.3950743089 -1.072699e+00
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## [1640,] -0.0686016174 1.5679051309 -4.369981e-01
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## [1642,] 1.1117997016 -0.1189790511 -3.124690e-01
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## [1657,] 1.1612787802 1.1646271660 1.621238e+00
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## [1660,] 0.4548314981 0.9640632452 2.400165e-01
## [1661,] -0.9922493921 0.6193438645 -6.890296e-01
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## [1665,] -1.0275244962 0.5456444832 -6.531928e-01
## [1666,] -1.2703677782 -0.3359974295 4.092544e-01
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## [1685,] -1.0385231068 -0.0457853689 4.527630e-02
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## [1868,]  0.5249439936 -1.5417659177 -6.899256e-01
## [1869,]  1.62744464679 -0.0470102102 -5.215861e-02
## [1870,]  0.3740191313  0.6888761092 -1.740451e-01
## [1871,]  1.4197760196  1.2597172639  2.123450e+00
## [1872,]  0.4939836143  0.9141637892  4.128006e-01
## [1873,]  1.5384553518  0.4817765319  9.584540e-01
## [1874,] -1.1269764271 -1.4556975557  1.606396e+00
## [1875,] -1.3088551863  0.4196746077 -4.776455e-01
## [1876,] -1.2987327422  1.0173406745 -1.168752e+00
## [1877,] -0.1998148856 -0.6461384978 -3.776457e-02
## [1878,] -0.1242564687 -0.1276489882 -9.687266e-02
## [1879,] -0.0094794894  1.2071995869 -8.260151e-03
## [1880,] -0.1891461633 -0.2701695405 -1.862414e-01
## [1881,] -0.3592225734  0.2665654342 -2.938621e-01
## [1882,]  1.4689232956 -0.3226058061 -5.756269e-01
## [1883,] -0.6964691452  0.4061799043 -3.923477e-01
## [1884,] -0.3605413888 -0.2438148442 -5.345418e-02
## [1885,] -0.6746367842 -1.0905986390  6.412164e-01
## [1886,] -1.2139904944 -1.4429240569  1.708407e+00
## [1887,] -1.2606008731 -0.5277634490  6.343219e-01
## [1888,] -1.1456619254 -0.3203736746  3.217004e-01
## [1889,] -0.6852378169  0.2834928549 -3.793256e-01
## [1890,]  0.6510015387 -0.7495020048 -6.111697e-01
## [1891,]  1.3850531503  0.4540587422  7.541460e-01
## [1892,]  0.2215992681  0.1593332625 -2.199250e-01
## [1893,] -0.0489870169 -0.4652001108 -1.507397e-01
## [1894,] -1.1614382697  0.7276727565 -8.201871e-01
## [1895,] -0.7039473691  1.0568405315 -7.539642e-01
## [1896,] -1.0815462512 -1.4881688560  1.570375e+00
## [1897,] -0.7358422848 -1.4916148843  1.104450e+00
## [1898,]  1.5313321683  0.5508542928  9.721367e-01
## [1899,] -1.2700149937  1.2353707377 -1.394844e+00
## [1900,]  0.8703947566  0.8308734313  4.168682e-01
## [1901,]  0.5087504826 -1.3635061798 -7.121369e-01
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## [1904,]  1.7380924357 -1.5720755753 -2.358521e+00
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## [1906,] -1.0610970797 -1.0937174528  1.118384e+00
## [1907,]  1.4524166661  1.0035894879  1.908983e+00
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## [1910,] -1.2143634341  0.2022787517 -2.621170e-01
## [1911,] -0.3050572845 -0.4152444390 -4.625321e-03
## [1912,]  0.4096067243  0.5944074308  2.044075e-01
## [1913,]  1.5378198180  0.5038506092  9.197004e-01
## [1914,] -0.3155638695 -0.2775427377 -7.441993e-02
## [1915,] -1.2718183087 -0.3075173276  3.758285e-01
## [1916,] -0.3029051779 -1.4942235214  4.965599e-01
## [1917,]  1.4725169343  0.4295309415  6.698453e-01
## [1918,] -0.2838669148 -0.0772477417 -3.342624e-01
## [1919,]  0.3511002061 -1.5330441431 -4.484773e-01
## [1920,] -0.4865418330  0.8089182474 -4.629380e-01
## [1921,]  1.0832552662  0.0878405527 -8.179003e-02
## [1922,]  0.5610759905  1.0562977105  4.452433e-01
## [1923,]  0.4483089322  1.3139796922  6.088664e-01
## [1924,]  0.0890497777 -1.5408649718 -1.757963e-05
## [1925,] -1.3301296331  0.8373827689 -9.678917e-01
## [1926,] -1.1269047935 -1.4663343097  1.631236e+00
## [1927,]  0.6769753049  1.4111632647  8.133921e-01
## [1928,] -1.2124432619 -1.4733028323  1.744061e+00
## [1929,] -0.3876365369 -1.5184555753  6.315424e-01
## [1930,] -1.2447640989  0.7463507138 -8.299555e-01
## [1931,]  0.9589052441 -1.5480328564 -1.315544e+00
## [1932,]  0.7943408963 -0.2429998981 -2.687217e-01
## [1933,] -0.6906835638 -1.5140041430  1.050234e+00
## [1934,] -1.2137970904 -1.4467214038  1.712864e+00
## [1935,] -1.2140871965 -1.4410253834  1.706178e+00
## [1936,]  1.2456771521  0.0257398790  1.110945e-01
## [1937,] -1.1961331095 -0.1783704509  2.150374e-01
## [1938,]  0.7427053558 -1.5676539354 -9.660883e-01
## [1939,] -1.2696908640 -0.3492881438  4.248531e-01
## [1940,] -0.9209571537 -1.2866342571  1.149080e+00
## [1941,]  1.8213286122 -1.5606626997 -2.421996e+00
## [1942,]  0.8348899583  0.6785200051  6.563519e-01
## [1943,]  1.4458537000  0.5418852108  1.088410e+00
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## [1950,] -1.3192990056  0.6247313414 -7.183119e-01
## [1951,]  0.5799479320  0.9179802425  2.967017e-01
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## [1953,]  0.6152477444 -0.4521726430 -4.183884e-01
## [1954,] -0.4007305028  0.7819702885 -4.977236e-01
## [1955,] -1.0680479610 -0.9504792145  9.412178e-01
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## [1982,] 1.3953754665 0.6556962750 1.052762e+00
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## [1984,] 0.8841397997 1.2496689063 1.156463e+00
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## [1988,] -0.6783944998 0.8070422580 -7.980309e-01
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## [2014,] -1.2609876812 -0.5201687552  6.254084e-01
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## [2016,]  0.7809679289  0.2439323562 -6.404589e-02
## [2017,]  1.0403506124  1.1659917896  1.566814e+00
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## [2021,]  1.3986123927  1.3201578807  2.527885e+00
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## [2023,] -0.2133170320 -1.5020183928  3.143809e-01
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## [2029,] -1.2124432619 -1.4733028323  1.744061e+00
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## [2042,] -1.2211464447 -1.3024222208  1.543506e+00
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## [2050,] -1.2270374649 -0.3699637914  4.321845e-01
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## [2060,] 0.0468967698 -1.5361371961 1.956547e-02
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## [2065,] -1.3582699239 1.3898967459 -1.616354e+00
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## [2139,] -0.1219574666 0.3919536961 -3.862151e-01
## [2140,] -1.1865898302 -0.3317490627 3.495390e-01
## [2141,] -0.9026671089 0.4533327873 -4.735542e-01
## [2142,] 1.0147350719 1.3939448619 1.667412e+00
## [2143,] -0.4719956294 -1.5394870799 7.486989e-01
## [2144,] -0.9945814200 -1.5054132811 1.480890e+00
## [2145,] 0.4340601474 1.1252804643 3.809510e-01
## [2146,] -0.5192448030 0.7857016644 -6.215420e-01
## [2147,] 1.6818727925 -1.4243590905 -2.328439e+00
## [2148,] -1.2702710762 -0.3378961030 4.114828e-01
## [2149,] -0.3268764440 0.4209858750 -4.555135e-01
## [2150,] -0.2142418970 -1.5219228353 3.886986e-01
## [2151,] -0.1592191518 0.7284395360 -2.521751e-01
## [2152,] -1.2891750155 0.8076569883 -8.931704e-01
## [2153,] 0.6107014028 1.2539644829 7.972846e-01
## [2154,] 0.9448287903 0.4845017862 4.071207e-01
## [2155,] -0.6169087438 -1.3143112767 7.624187e-01
## [2156,] 1.5584626806 0.3271068456 8.211519e-01
## [2157,] -1.2792298172 0.6293886523 -7.067007e-01
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## [2159,] -0.2444807932 1.1986189758 -2.688773e-01
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## [2160,] 1.4004830022 0.8861998062 1.415927e+00
## [2161,] -0.6922383832 -1.4901477962 1.031166e+00
## [2162,] 0.9891309124 0.7779141218 6.585347e-01
## [2163,] -0.8734925813 1.2595336065 -1.112835e+00
## [2164,] -1.0704998188 0.5394209895 -5.844814e-01
## [2165,] 1.1667773918 0.3402103796 3.183716e-01
## [2166,] -0.4545529026 -0.0684282726 -1.760622e-01
## [2167,] -1.2489130828 0.0655795946 -8.706888e-02
## [2168,] -1.2583767264 -0.5714329386 6.855749e-01
## [2169,] -1.2162239487 1.0050630814 -1.153588e+00
## [2170,] -0.4315730316 -1.4948404880 6.505522e-01
## [2171,] -0.1567158374 0.7418902083 -3.517680e-01
## [2172,] 1.6554088264 -1.5819545015 -2.313424e+00
## [2173,] 1.4633159388 0.8843148830 1.922160e+00
## [2174,] 1.0426190825 -1.5569651945 -1.340459e+00
## [2175,] -1.0376091559 -1.5031137869 1.529566e+00
## [2176,] 1.4670259415 0.7064617967 1.194948e+00
## [2177,] 0.6637900540 0.5413806628 1.156071e-01
## [2178,] 0.8232784919 1.0793231219 1.031116e+00
## [2179,] -1.2286621792 -0.3398001085 3.991073e-01
## [2180,] -1.3041233192 1.1128994467 -1.267142e+00
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## [2182,] 0.7431510889 -1.5339097267 -1.062583e+00
## [2183,] 1.3519881103 1.2864677437 2.761516e+00
## [2184,] -0.0323258318 -1.1293766562 3.460095e-03
## [2185,] 1.7165701036 -1.4367814579 -2.132718e+00
## [2186,] 1.5190169180 0.3610212704 6.962469e-01
## [2187,] -1.3499535493 1.2266108283 -1.424712e+00
## [2188,] 0.8992955266 0.5296896445 4.139023e-01
## [2189,] 1.1675446090 -1.5190603930 -1.489766e+00
## [2190,] -1.3271318701 0.7785238917 -8.988116e-01
## [2191,] -0.0554811756 -1.3167953958 6.436357e-03
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## [2193,] 1.4055027353 -0.2273862030 -2.243772e-01
## [2194,] -0.6269605124 0.0136283058 -1.566092e-01
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## [2198,] -1.0598977330 0.3824803017 -4.688612e-01
## [2199,] 1.4595780844 0.9714589480 1.801470e+00
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## [2204,] -1.3683269351 1.5873587858 -1.848106e+00
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## [2208,] -0.8216111909 -1.5143929679 1.263051e+00
## [2209,] -0.7460688327 -1.2989577301 8.892252e-01
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## [2210,] -0.8101884470  0.9256073429 -8.613007e-01
## [2211,]  1.6453233013 -0.6554136947 -1.146566e+00
## [2212,]  1.1156079402  1.1660906599  1.741488e+00
## [2213,]  1.2870920125  0.5729714236  8.772380e-01
## [2214,]  1.5214285576  0.2723626999  8.556017e-01
## [2215,] -0.5709013226  1.0176006079 -9.229012e-01
## [2216,]  1.5807123643  0.2003332531  5.548238e-01
## [2217,]  1.6168658002 -0.2406964484 -3.639611e-01
## [2218,]  0.1095503758  1.2005651962  1.093001e-01
## [2219,] -0.2570645101  0.9148544184 -3.017180e-01
## [2220,] -0.6610476767  0.5474663915 -6.018367e-01
## [2221,]  0.1139482849 -0.8678934144 -1.921796e-01
## [2222,] -0.2994271003 -0.9930188974  2.224486e-01
## [2223,]  1.2643844580 -1.5652365371 -1.766127e+00
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## [2228,]  0.3063943475 -1.5505730441 -3.058752e-01
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## [2230,] -0.3714464468 -0.1050521982 -1.154404e-01
## [2231,]  0.3157491632  0.4195349979 -1.187909e-01
## [2232,] -1.1469615111  0.4427924928 -4.849790e-01
## [2233,] -0.1615405171 -0.6096226025 -5.901772e-02
## [2234,] -1.3587534341  1.3993901132 -1.627496e+00
## [2235,]  1.5731048810 -1.1039518089 -1.350994e+00
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## [2239,]  1.2366086898  0.9052602810  1.369353e+00
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## [2260,] 1.3450446092 1.3325933992 1.751610e+00
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## [2265,] -1.3104991209 0.4519520565 -5.155282e-01
## [2266,] -1.2583949442 1.0444148799 -1.220522e+00
## [2267,] 0.2276911615 0.8689488906 -9.819671e-03
## [2268,] -1.2697875660 -0.3473894703 4.226247e-01
## [2269,] 0.0477222932 -1.5230098970 -3.511425e-02
## [2270,] -0.4848600768 1.3203060645 -7.154172e-01
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## [2289,] 1.5519599516 0.4065755033 7.924200e-01
## [2290,] -0.9402065610 1.6923501137 -1.523192e+00
## [2291,] -1.2220167630 -1.2853341597 1.523450e+00
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## [2295,] 0.6922919566 -0.3777653923 -4.773740e-01
## [2296,] 0.5036011339 1.1680228356 5.987420e-01
## [2297,] -1.0650999829 1.1196426540 -1.107627e+00
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## [2299,] -1.2234332517 -0.4293062596 4.865391e-01
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## [2302,] -1.2253490564 0.3993300504 -4.684293e-01
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## [2310,] 1.5162383235 0.6238106334 1.185584e+00
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## [2312,] -1.0829140523 -1.4572919716 1.528753e+00
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## [2314,] 1.4443673526 0.8602728414 1.404096e+00
## [2315,] -0.9444051612 1.1046275180 -1.012775e+00
## [2316,] 1.1701372732 0.5918678174 6.743262e-01
## [2317,] 1.2215898291 0.7534314924 1.069046e+00
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## [2319,] -0.2417767881 1.2104596514 -3.697003e-01
## [2320,] -0.7629793200 0.7940526133 -6.951454e-01
## [2321,] -1.0818957884 -1.4869720635 1.576555e+00
## [2322,] 1.4412511231 1.1047879369 1.948219e+00
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## [2326,] -0.1751135601 0.0349541641 -2.451470e-01
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## [2329,] 1.0285734513 -0.1195287596 -2.765475e-01
## [2330,] -0.7279730942 0.8561699655 -6.948162e-01
## [2331,] -1.1133661388 -0.1422546419 1.018322e-01
## [2332,] -0.6488043589 0.3192325506 -3.502403e-01
## [2333,] 0.8351511054 1.1794627850 4.674554e-01
## [2334,] 1.8738431508 -1.5604647792 -2.726307e+00
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## [2337,] 1.2513233928 1.3137448383 2.109366e+00
## [2338,] -0.2236992174 1.4769685411 -4.379125e-01
## [2339,] -1.1775417573 -0.4973380001 5.277341e-01
## [2340,] -0.7020374559 -0.7939190060 6.160684e-01
## [2341,] -1.0821911421 -1.4834577331 1.575489e+00
## [2342,] 1.4607516910 0.6998798271 1.376403e+00
## [2343,] -0.9184157934 -1.3272560263 1.184338e+00
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## [2345,] 1.5265594546 0.5311036733 1.147209e+00
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## [2354,] 1.1301950426 -1.5660117333 -1.466604e+00
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## [2356,] 1.4339542787 -1.5598175540 -1.930762e+00
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## [2360,] -0.8034432037 0.7861324894 -6.881845e-01
## [2361,] -0.6706928442 1.1552704133 -7.988227e-01
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## [2366,] 1.3014938013 1.2294189517 2.079027e+00
## [2367,] -1.2230804853 -1.2644487516 1.498938e+00
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## [2369,] 1.4741601577 -0.6630886865 -9.343828e-01
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## [2381,] -1.1447623456 -1.1193242325 1.228798e+00
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## [2410,] -0.1712831550 -1.5049097587 2.933154e-01
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## [2413,] -0.8590625364 -0.9140447078 7.391521e-01
## [2414,] -0.2854933705 0.8059824371 -3.574673e-01
## [2415,] -0.8596996697 -0.2552285394 1.772278e-01
## [2416,] -1.1200955242 -0.7868466165 8.216486e-01
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## [2419,] -0.4764536432 -1.5041860209 7.771878e-01
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## [2421,] -0.1273987418 -1.5004968361 2.052574e-01
## [2422,] -0.5598505866 -0.9399780861 4.752361e-01
## [2423,] -1.2428076995 -0.8771193657 1.044346e+00
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## [2425,] 1.0338290112 0.4208967520 3.806120e-01
## [2426,] -0.0640791713 -0.2795487164 -2.204709e-01
## [2427,] -1.1773925585 -1.3135415031 1.497902e+00
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## [2439,] 1.4365116654 1.1089679829 2.062294e+00
## [2440,] -0.1662476422 1.2351514459 -2.639579e-01
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## [2460,] -1.3225868747  0.6892862390 -7.940772e-01
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## [2462,]  1.3469868394 -1.5360790021 -1.857525e+00
## [2463,]  0.5627250782  0.9806921204  5.918475e-01
## [2464,] -1.1408591474 -0.4110628347  4.233057e-01
## [2465,]  0.0022096253 -1.5189401884  7.443070e-02
## [2466,]  1.6260251323 -1.4099715501 -1.973162e+00
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## [2468,]  1.4195439060 -0.0045893630 -7.667112e-02
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## [2470,]  0.4612066386  1.3064418168  2.887885e-01
## [2471,]  0.7159830487  0.9863382957  8.553991e-01
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## [2474,] -1.1340915067 -0.5656453682  6.337896e-01
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## [2486,]  0.1573985286  1.1856419126 -3.436462e-02
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## [2491,]  0.3908434560 -1.5249574067 -4.369149e-01
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## [2560,] -0.6351766944 0.7380896123 -6.842444e-01
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## [2571,] 0.2681433718 -1.5436815535 -3.942931e-01
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## [2589,] 1.4321658130 -1.5539467978 -1.898501e+00
## [2590,] 1.1634397181 1.1207822062 1.674593e+00
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## [2607,] -0.9386823990 0.3624087626 -3.749866e-01
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## [2609,] -1.3284856985 0.8051053201 -9.300091e-01
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## [2659,] 0.9167512209 1.2314560215 1.421561e+00
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## [2660,] 1.1074998751 0.7802806497 7.708530e-01
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## [2678,] -1.1445900471 -0.3412364414 3.459414e-01
## [2679,] -1.0835713311 0.7306817707 -7.214180e-01
## [2680,] 1.3325551605 0.9970795986 1.846306e+00
## [2681,] 1.4759211054 0.8326224581 1.720705e+00
## [2682,] -0.5887839395 0.6519452910 -6.107192e-01
## [2683,] -0.2590769018 0.9547775040 -3.491246e-01
## [2684,] -1.1624338989 0.7162403590 -7.652944e-01
## [2685,] 1.4069841980 1.3390641169 2.260332e+00
## [2686,] -1.0400090158 0.7645402487 -8.749883e-01
## [2687,] -1.0350632044 -0.0253449236 -9.702147e-02
## [2688,] -0.3820227509 -0.4417563967 -6.804111e-02
## [2689,] 1.8713240620 -1.5956304651 -2.571743e+00
## [2690,] -0.9080281336 -1.5042960707 1.356092e+00
## [2691,] 0.7496670121 0.4170943847 3.236480e-01
## [2692,] 1.6041814926 -1.0007322939 -1.350640e+00
## [2693,] 1.4952586168 0.4576014095 1.078087e+00
## [2694,] -1.1688507564 -1.4892043588 1.714714e+00
## [2695,] -0.0269476554 1.1005823606 -3.577759e-01
## [2696,] 0.2509204381 -1.3791151476 -3.550431e-01
## [2697,] 1.3964401859 -1.5833872808 -1.962018e+00
## [2698,] -1.2584734285 -0.5695342652 6.833466e-01
## [2699,] -1.2702710762 -0.3378961030 4.114828e-01
## [2700,] 0.8763798521 -0.2544146581 -2.433758e-01
## [2701,] 1.8400456057 -1.4072362292 -2.222908e+00
## [2702,] -1.2800007939 0.6532538568 -7.463942e-01
## [2703,] -1.2837947800 1.4875118685 -1.666119e+00
## [2704,] -0.8870362391 1.4624864260 -1.266736e+00
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## [2706,] -0.2148485846 -1.4954344351 3.380962e-01
## [2707,] -0.2562637549 0.9235787152 -3.446847e-01
## [2708,] -0.9282971824 -1.1401420635 9.739676e-01
## [2709,] -1.2129267721 -1.4638094650 1.732919e+00
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## [2710,] 0.7831800301 0.8604268705 4.819960e-01
## [2711,] 0.5065985071 -1.3521431751 -6.841206e-01
## [2712,] -0.4968375259 -0.6076261380 1.370022e-01
## [2713,] 1.5155779271 0.5959718772 1.272884e+00
## [2714,] 1.3339464177 -0.8123946872 -1.179873e+00
## [2715,] 0.9541837548 0.1164427282 9.402560e-03
## [2716,] -0.6832452907 -0.3498894632 8.307258e-02
## [2717,] -0.9578842480 0.6970185258 -7.109357e-01
## [2718,] 0.1362311798 -1.5576391832 -1.215066e-01
## [2719,] -0.3444086164 -1.4855253914 4.890940e-01
## [2720,] 1.4349225001 -1.5614639756 -1.952075e+00
## [2721,] -1.1774423636 -1.3115126420 1.494113e+00
## [2722,] -0.0866354263 -1.4960797220 1.992269e-01
## [2723,] -1.1949829359 1.3236962649 -1.435908e+00
## [2724,] -0.2907199076 -0.0659322229 -1.825606e-01
## [2725,] -1.2983421563 1.0054222230 -1.149075e+00
## [2726,] 0.5360505883 1.2837219091 5.316578e-01
## [2727,] 1.0862291609 1.1759405148 1.412432e+00
## [2728,] -1.0832208021 -1.4711462559 1.571623e+00
## [2729,] -1.2803280873 -0.1404340631 1.797300e-01
## [2730,] -0.7780928641 -1.4828237262 1.116389e+00
## [2731,] 0.7870622588 0.1546614760 4.777507e-05
## [2732,] 1.0497698915 0.6251289192 5.250259e-01
## [2733,] 1.1327817007 1.0273932153 1.638538e+00
## [2734,] 0.4083739873 0.2966440987 -9.162317e-02
## [2735,] 1.0274075896 0.9484105764 1.377140e+00
## [2736,] -1.2592470447 -0.5543448775 6.655194e-01
## [2737,] -1.1854616109 1.1182457710 -1.170005e+00
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## [2741,] -1.3397998361 1.0272501150 -1.190731e+00
## [2742,] 0.0847243300 -1.4900260475 -1.405033e-02
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## [2745,] 0.0271066585 0.4206315385 -7.029278e-02
## [2746,] -1.1246028648 -1.5054536285 1.669013e+00
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## [2751,] 0.7442704646 -1.5459721494 -1.061700e+00
## [2752,] -1.2138937924 -1.4448227304 1.710635e+00
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## [2754,] -1.0393503930 -1.4776078211 1.511254e+00
## [2755,] -1.2113795396 -1.4941882403 1.768573e+00
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## [2757,] -0.8546278209 -0.9472433215 7.059935e-01
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## [2759,] 1.2490088823 0.3271629817 3.427585e-01
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## [2760,] -0.1008277423  0.1363779543 -2.995042e-01
## [2761,] -0.8136602964  0.3377351156 -3.696106e-01
## [2762,]  1.0925375691  1.3642681491  1.849994e+00
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## [2766,] -0.7030168617  1.1287715734 -9.591412e-01
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## [2769,] -0.2396879806 -1.1873103495  2.168723e-01
## [2770,] -1.0588404557 -0.3618544230  2.968753e-01
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## [2789,] -1.2061029223  0.7752719153 -8.422951e-01
## [2790,] -0.1479068616 -0.2514283348 -2.407708e-01
## [2791,] -0.9862371910  0.5363463583 -6.385383e-01
## [2792,]  0.8417167444  0.6714659803  4.946325e-01
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## [2797,]  1.0493077201  1.0998379563  1.497581e+00
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## [2799,]  0.6144788569 -1.5388730923 -8.975557e-01
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## [2802,]  0.9841707532  0.5413183471  3.068027e-01
## [2803,] -0.9505140979 -1.5091610853  1.408528e+00
## [2804,] -1.3205105199  1.4379858125 -1.653147e+00
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## [2807,]  0.4383167344 -1.5365871127 -5.790008e-01
## [2808,]  1.2223302050  1.0064855628  1.490345e+00
## [2809,]  1.6746498412 -1.4270733263 -2.131765e+00
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## [2810,] 1.3085657730 -0.6661401829 -8.801909e-01
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## [2814,] -0.2227148885 1.0921736161 -5.735617e-01
## [2815,] -1.1542506557 -0.1600109502 1.445617e-01
## [2816,] 1.0269384340 -1.4206241757 -1.270835e+00
## [2817,] -1.3172682630 0.5848591987 -6.715156e-01
## [2818,] 0.3081249250 0.4655505866 -3.399690e-02
## [2819,] 0.4356844573 -1.5135547111 -5.676778e-01
## [2820,] 1.4807497105 -1.5863317243 -2.017635e+00
## [2821,] -0.6197573914 -1.2658740608 7.156023e-01
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## [2823,] -1.2703677782 -0.3359974295 4.092544e-01
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## [2825,] -1.0187348379 0.3576669529 -4.119564e-01
## [2826,] 1.1704215790 -0.2556925890 -4.333366e-01
## [2827,] -0.9160254594 1.3867328197 -1.390963e+00
## [2828,] 0.2977313239 0.1618604143 -7.434394e-02
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## [2830,] 0.5660475521 -1.5255686631 -7.344956e-01
## [2831,] 1.4091831177 -0.2171693075 -3.467848e-01
## [2832,] 0.5611970660 1.0089571298 5.609986e-01
## [2833,] -1.2130234741 -1.4619107915 1.730691e+00
## [2834,] 0.5241292972 -1.5310248149 -6.954971e-01
## [2835,] 0.5270001365 -1.5533949579 -7.147546e-01
## [2836,] -0.4395235819 0.7765212658 -5.408881e-01
## [2837,] -1.1357300156 -1.2914582398 1.423851e+00
## [2838,] -1.1403421440 -0.4226303457 4.387784e-01
## [2839,] 1.0001162371 -1.5553757045 -1.303796e+00
## [2840,] -1.2434904753 1.5166602176 -1.722218e+00
## [2841,] -0.9503930687 1.2440376448 -1.205635e+00
## [2842,] -1.2514436476 0.1148998219 -1.444645e-01
## [2843,] -0.3004564664 0.5762920497 -4.636214e-01
## [2844,] -0.3223375788 -0.2400016569 9.309155e-03
## [2845,] -0.7355553559 -1.4843169906 1.078573e+00
## [2846,] 1.0021931776 0.9069743410 1.067474e+00
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## [2851,] 0.5672458165 -1.5612504331 -6.763456e-01
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## [2853,] 0.6168752712 -0.1056366667 -2.552705e-01
## [2854,] -0.8246960930 -1.4774472158 1.251316e+00
## [2855,] 1.4523122033 0.4861321261 1.058722e+00
## [2856,] 1.2735538721 0.9120808320 1.457644e+00
## [2857,] -1.3318702696 0.8715588912 -1.008003e+00
## [2858,] -1.0578069587 0.3557775434 -4.567295e-01
## [2859,] -1.2596338528 -0.5467501836 6.566058e-01
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## [2860,] -1.1706643633 0.1650018313 -2.405622e-01
## [2861,] 1.2046351257 1.1827440069 1.512631e+00
## [2862,] -0.8887190222 0.8774135991 -8.291046e-01
## [2863,] -0.2167599904 -1.4985734552 3.962239e-01
## [2864,] -0.3179979262 0.8071550064 -5.825616e-01
## [2865,] -1.1433670073 1.1827037773 -1.361874e+00
## [2866,] 0.8545769106 1.2503391751 8.553095e-01
## [2867,] -0.8120363753 0.9118089275 -7.780610e-01
## [2868,] 0.5544374772 -1.4407741097 -6.423618e-01
## [2869,] -0.3879450999 1.1226399152 -6.131517e-01
## [2870,] 1.5250707686 -1.5763724128 -2.131105e+00
## [2871,] -0.4824839680 0.8093474384 -5.706772e-01
## [2872,] -0.4306479608 -1.5161107985 6.796760e-01
## [2873,] 1.0464396623 0.9145595113 9.619291e-01
## [2874,] -0.4851411876 0.8843215345 -6.891962e-01
## [2875,] 1.3926292586 0.9445810125 1.475686e+00
## [2876,] -0.8809776751 0.6973615247 -5.802253e-01
## [2877,] -0.0461538931 0.0103757487 -3.435090e-01
## [2878,] -0.8833472041 0.1602260762 -2.449800e-01
## [2879,] 1.6712055073 -1.3846240050 -2.147880e+00
## [2880,] 1.5209859856 0.5026287569 1.365247e+00
## [2881,] 1.2049920135 1.3588842165 2.137247e+00
## [2882,] 0.9820036034 1.1088147981 1.091055e+00
## [2883,] -1.2605041711 -0.5296621225 6.365503e-01
## [2884,] -1.3106925249 0.4557494034 -5.199850e-01
## [2885,] 1.1328803002 -0.6105200677 -7.081607e-01
## [2886,] 0.5917802430 0.1172600025 -1.556510e-01
## [2887,] -1.3275186782 0.7861185855 -9.077252e-01
## [2888,] -1.2129267721 -1.4638094650 1.732919e+00
## [2889,] -0.4078271283 -0.1146399161 -2.116168e-01
## [2890,] 0.6721378203 -0.2235032497 -3.351891e-01
## [2891,] 0.3513562499 -1.5301662325 -4.624378e-01
## [2892,] -0.6909718997 -1.4974675968 1.016267e+00
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## [2894,] -1.0865806293 0.1397593601 -2.342228e-01
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## [2899,] -0.7718996225 -0.9264050026 6.321904e-01
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## [2901,] -0.5101717247 0.5985109200 -3.897320e-01
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## [2903,] -0.5761168611 0.9619467311 -6.459868e-01
## [2904,] -0.6810670374 1.3648546765 -1.052694e+00
## [2905,] 0.4788016529 -0.3638590837 -2.833732e-01
## [2906,] 0.2429547872 -1.3470500687 -2.262261e-01
## [2907,] -1.3155276264 0.5506830764 -6.314046e-01
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## [2910,] -0.0076389550  0.0323896192 -3.346508e-01
## [2911,]  1.6537442018 -0.2709023630 -1.808902e-01
## [2912,]  0.8640232058 -0.7452051672 -8.385857e-01
## [2913,]  1.6978010285 -1.5621799184 -2.400854e+00
## [2914,] -0.9611216724 -0.6244699646  5.411908e-01
## [2915,]  0.7564454648 -0.5749721739 -5.916579e-01
## [2916,]  1.5534264937  0.3738056058  8.362026e-01
## [2917,] -1.0343098111  1.3109190160 -1.320977e+00
## [2918,] -0.2606846721  1.0088265697 -4.426565e-01
## [2919,]  0.8094385799  0.7036067336  1.857834e-01
## [2920,] -0.9060479023  0.5154626009 -5.407843e-01
## [2921,]  0.5876720649  1.1492461897  5.891733e-01
## [2922,]  1.2796145508  1.3182126802  2.431038e+00
## [2923,] -1.3085650803  0.4139785873 -4.709604e-01
## [2924,]  1.3361207118  0.6909652917  1.445133e+00
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## [2926,]  0.0733701874 -1.3156689995 -1.536593e-01
## [2927,] -0.0994036599  1.4112697727 -3.103683e-01
## [2928,]  0.7422935053  1.4270131490  1.209743e+00
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## [2930,] -0.7318695199 -1.5130931582  1.053988e+00
## [2931,]  1.5117882759  0.4233049069  7.297710e-01
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## [2934,]  0.7348354212  0.9628239871  4.189420e-01
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## [2936,]  0.9060664554 -0.4385594552 -5.610446e-01
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## [2939,]  0.4645363216 -1.3753358630 -5.967778e-01
## [2940,] -0.8082258070 -0.3576072061  1.579831e-01
## [2941,] -0.9898012564  0.5719619329 -6.343371e-01
## [2942,]  0.7163745358  0.4182467756  1.193149e-01
## [2943,]  0.5942792732  0.7410524106  3.645139e-01
## [2944,]  0.2323973474  1.1178423588  3.176915e-01
## [2945,]  1.0102546620 -0.2631813092 -5.106575e-01
## [2946,] -1.0812598914 -1.4743711751  1.528183e+00
## [2947,] -0.5068035272  0.0773036397 -2.453205e-01
## [2948,] -0.1265985871 -1.5004426958  1.840894e-01
## [2949,] -0.6251132226  1.5562510126 -8.512408e-01
## [2950,] -1.0705649721  0.5847496901 -6.966520e-01
## [2951,] -1.1117157315  1.2680144833 -1.331631e+00
## [2952,]  0.6442540798  1.0090370309  5.307058e-01
## [2953,] -1.2059942551  0.7842420693 -8.676879e-01
## [2954,] -1.2111861355 -1.4979855872  1.773030e+00
## [2955,] -0.3285730948  1.3061883115 -4.818284e-01
## [2956,] -0.5211380821  1.3803512947 -9.892373e-01
## [2957,] -0.8152763932 -0.2558210769  8.758150e-02
## [2958,] -1.1475221469 -1.0684732532  1.173582e+00
## [2959,]  0.1996972456 -1.3367200353 -1.916854e-01
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## [2960,] -0.3219357082 -0.1478669094 -2.327321e-01
## [2961,]  0.7126786478  0.3754800011  3.239079e-01
## [2962,] -0.7138263156 -0.5384181022  2.840212e-01
## [2963,]  0.9078994919  1.4062585071  1.215057e+00
## [2964,] -1.2670530633  1.1742452656 -1.319127e+00
## [2965,]  1.1499292072  1.1547915008  1.944272e+00
## [2966,] -1.1430706377  0.4015827838 -4.837158e-01
## [2967,]  1.0080506830  0.6679020199  4.376219e-01
## [2968,]  1.6593771962 -0.1924183876 -5.261355e-01
## [2969,]  1.0776136563  0.9226959814  1.198609e+00
## [2970,] -0.2670592449  1.0843167500 -4.647616e-01
## [2971,] -1.2078107570  0.0492665925 -4.992820e-02
## [2972,] -0.4411274068 -1.3544954126  5.490876e-01
## [2973,] -1.2110894335 -1.4998842607  1.775259e+00
## [2974,] -0.4051925945  0.8172600269 -4.690991e-01
## [2975,]  1.0773151107 -0.4913265045 -6.236211e-01
## [2976,]  1.8412622840 -1.4125271688 -2.241596e+00
## [2977,]  1.6473417949 -1.5566722264 -2.164901e+00
## [2978,]  0.9981781186 -1.5174135560 -1.348228e+00
## [2979,]  1.4878231670  0.5214780616  1.113044e+00
## [2980,] -0.1452370881 -1.3029648841  1.778613e-01
## [2981,] -0.0441552108  1.6613874096 -2.379051e-01
## [2982,]  0.9265530101  0.0076192270 -6.744702e-02
## [2983,]  0.1759642976 -1.5192408610 -1.858323e-01
## [2984,]  1.4366077983  1.1135690967  2.048207e+00
## [2985,] -1.2105092213 -1.5112763015  1.788629e+00
## [2986,] -0.8518347636 -0.9741636353  7.002123e-01
## [2987,]  0.1103040612  0.8411354632 -8.401374e-02
## [2988,] -0.7694756860 -0.9846897236  7.149110e-01
## [2989,] -1.2128300701 -1.4657081384  1.735147e+00
## [2990,]  1.3547247547 -0.9757596342 -1.315595e+00
## [2991,] -1.2222101670 -1.2815368128  1.518993e+00
## [2992,] -0.5836870536 -0.0465013545 -6.645231e-02
## [2993,]  1.4121126767  0.5569622728  8.608833e-01
## [2994,] -1.2765914546  0.5912032879 -6.801136e-01
## [2995,] -0.4335120826 -1.4850535180  6.769314e-01
## [2996,] -0.8901559432  0.8669232793 -7.649795e-01
## [2997,] -0.8657291246 -1.4761117062  1.249983e+00
## [2998,] -0.2688133781  0.6464101707 -3.949933e-01
## [2999,] -0.2633432489  0.5662420951 -3.373623e-01
## [3000,] -1.3457953620  1.1449678695 -1.328891e+00
## [3001,] -0.2137274387 -1.4966563319  3.116968e-01
## [3002,] -0.7828194815  0.5096479639 -5.356425e-01
## [3003,] -0.0365670383  0.3660044181 -4.124463e-01
## [3004,] -0.7777806293 -1.4927925612  1.133227e+00
## [3005,] -1.2217266569 -1.2910301801  1.530135e+00
## [3006,]  0.1811221223  0.5020627060 -1.705311e-02
## [3007,] -0.8656750041 -1.5041340558  1.318964e+00
## [3008,]  0.9000309085 -0.0916252676 -1.975034e-01
## [3009,] -0.1547334917  0.2558439477 -2.592674e-01
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## [3010,] 0.3940318347 0.7418776522 2.432909e-01
## [3011,] 1.0151000366 0.5336056339 5.897343e-01
## [3012,] -1.1976512271 -0.1544122181 1.947488e-01
## [3013,] -0.5825812559 -0.0044234117 -2.012343e-01
## [3014,] 1.6287966929 -1.4087789490 -2.049008e+00
## [3015,] -0.3985541341 -0.2557661170 -1.007936e-01
## [3016,] 0.1314633637 -1.0381501803 -2.248122e-01
## [3017,] -1.0386702702 -1.4887225057 1.521301e+00
## [3018,] -1.1684915934 -1.4838730625 1.691879e+00
## [3019,] 1.5372180777 0.5281856211 8.743782e-01
## [3020,] -0.8658229183 -1.4763720814 1.253103e+00
## [3021,] 1.6258417173 -1.3649711486 -2.081399e+00
## [3022,] -0.7272577079 0.8538216631 -7.077203e-01
## [3023,] -0.9087049848 -1.4606654690 1.264266e+00
## [3024,] -1.0873485511 -0.6139764381 6.031082e-01
## [3025,] -0.3358052864 -0.4980476189 -6.491098e-02
## [3026,] -1.3272285721 0.7804225651 -9.010400e-01
## [3027,] 0.7179349191 0.1239030171 -2.587242e-01
## [3028,] -0.5178837408 -1.5256240066 8.435077e-01
## [3029,] 1.2709098826 1.1904137205 1.904391e+00
## [3030,] -1.3368020732 0.9683912377 -1.121651e+00
## [3031,] -0.3174681329 0.2173887719 -1.912960e-01
## [3032,] 1.5156309723 -0.6718773817 -9.258319e-01
## [3033,] 0.1297656587 -1.5149083143 -5.891695e-02
## [3034,] 1.2545467565 1.0413545617 1.632460e+00
## [3035,] 1.6542752723 -0.2412554987 -2.693338e-01
## [3036,] 1.4021070370 1.0940302592 1.927618e+00
## [3037,] -1.2698842681 -0.3454907968 4.203963e-01
## [3038,] 0.7024441059 -1.1983196878 -8.357328e-01
## [3039,] -1.1899277526 -1.0904521676 1.266902e+00
## [3040,] -1.2611810853 -0.5163714083 6.209516e-01
## [3041,] 0.6540189308 -0.0440870760 -3.096974e-01
## [3042,] 1.0178542266 1.0150763023 1.460760e+00
## [3043,] -0.0676273077 0.7023686685 -4.411049e-01
## [3044,] -1.2166932245 -0.5557928592 6.271609e-01
## [3045,] -1.1247467325 -1.4928502771 1.641130e+00
## [3046,] -1.1755868450 0.9679545020 -1.051973e+00
## [3047,] 1.4924904222 0.5344345567 9.578140e-01
## [3048,] 0.2311593185 -0.3381838087 -2.977852e-01
## [3049,] 1.1857713247 1.0289099927 1.318426e+00
## [3050,] 1.2472481251 1.0644357030 1.766315e+00
## [3051,] 0.6563474764 0.2545511444 -4.466806e-02
## [3052,] 0.7172716143 0.0982233097 -1.767718e-01
## [3053,] -0.1662017470 -1.5168090259 1.896463e-01
## [3054,] -0.6099797443 -0.2036212978 -5.713326e-02
## [3055,] 1.5027616854 -1.4389281045 -1.890024e+00
## [3056,] -0.2240332084 -0.8755163133 9.856951e-02
## [3057,] -0.5034676296 1.5525437469 -8.097890e-01
## [3058,] -0.2551556101 -1.0070355341 1.705185e-01
## [3059,] 0.0733825875 1.1742314999 4.960025e-02
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## [3060,] -0.4800334433  0.2249132347 -2.432941e-01
## [3061,] -1.2619547016 -0.5011820206  6.031244e-01
## [3062,] -0.9505951626  0.5655547677 -5.722413e-01
## [3063,] -1.1348029653  0.9160835227 -9.171265e-01
## [3064,]  0.6543596782  0.9244002324  4.777208e-01
## [3065,] -0.8220290901 -1.4700435043  1.162613e+00
## [3066,] -1.0613294027 -0.3297556418  2.816527e-01
## [3067,]  0.5128587329  0.7628524070  2.968213e-01
## [3068,]  1.1323392072  0.2970069121  2.555925e-01
## [3069,]  0.8462115877 -0.2966002603 -4.209469e-01
## [3070,]  0.1300794852 -0.1845863097 -1.798600e-01
## [3071,]  1.4165180878  1.0083428427  1.764104e+00
## [3072,] -1.0746872434 -0.1371225977  1.487945e-01
## [3073,]  0.5773282867 -0.4270238659 -5.613896e-01
## [3074,] -1.2987779318  0.9977111252 -1.118248e+00
## [3075,] -1.1813706751  0.3476586515 -4.180517e-01
## [3076,] -1.1767395116 -1.3182299847  1.492516e+00
## [3077,] -1.2003362698  0.6937598785 -7.890816e-01
## [3078,]  0.7996180477 -0.2543557736 -3.789011e-01
## [3079,]  1.3282607416 -1.4406991126 -1.604941e+00
## [3080,] -0.8645176939 -1.4835843357  1.236915e+00
## [3081,] -1.2975920479  1.7374373473 -1.931367e+00
## [3082,] -0.7139793747  1.2327007643 -9.321021e-01
## [3083,] -1.0597898590  0.9956879503 -9.357818e-01
## [3084,]  0.5058824527  0.4534790039  1.809285e-01
## [3085,]  1.4023510206  0.3265414432  6.198446e-01
## [3086,] -1.2768468143 -0.2087863077  2.599521e-01
## [3087,] -1.0827800793 -1.4655885464  1.546075e+00
## [3088,] -1.2219200609 -1.2872328332  1.525679e+00
## [3089,] -0.1445362632 -0.3135864499 -1.732017e-01
## [3090,]  0.3049578485 -0.2229428936 -3.740480e-01
## [3091,] -0.9280637361  0.8986058056 -9.247026e-01
## [3092,]  1.6293273049 -0.3209602748 -4.898577e-01
## [3093,] -1.1695372651 -1.4672717897  1.677655e+00
## [3094,] -0.1385241447  0.5540076499 -3.579025e-01
## [3095,] -0.5185810135 -1.4972199519  7.904735e-01
## [3096,]  0.8282845676  0.8357200739  4.350271e-01
## [3097,]  1.0109278926  0.3425398688  1.029003e-01
## [3098,] -1.1117193589 -0.2070310269  2.212900e-01
## [3099,] -1.2109927315 -1.5017829342  1.777487e+00
## [3100,] -0.9875558819  0.5110143939 -5.402329e-01
## [3101,] -0.2116275328 -0.4838898894 -1.349007e-01
## [3102,]  0.9144458033 -1.5692119358 -1.170249e+00
## [3103,]  1.4166988472  1.2316708041  2.274797e+00
## [3104,]  0.2979469324  1.3250413419  2.272177e-01
## [3105,]  1.1501754369 -1.3614013181 -1.429318e+00
## [3106,] -1.2103158173 -1.5150736484  1.793086e+00
## [3107,]  1.4691405357  0.9329910419  1.646767e+00
## [3108,]  1.4764754112  0.8298269896  1.713158e+00
## [3109,]  0.0516922045  1.0342219995 -1.050403e-01
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## [3110,] -1.1548249919  0.5813301944 -6.263479e-01
## [3111,] -0.8459068505  0.8680143227 -8.542772e-01
## [3112,]  0.3961430618  0.7455713847  1.785172e-01
## [3113,]  1.3679916768  1.0907311679  1.756099e+00
## [3114,]  0.6566793307 -1.5499704677 -9.023835e-01
## [3115,] -0.0727744382  0.7660964236 -4.659215e-01
## [3116,]  1.7156173562 -1.4177551009 -2.155476e+00
## [3117,] -0.6644345519 -0.0791781458 -1.496902e-02
## [3118,]  1.7031265467 -1.5669001587 -2.528976e+00
## [3119,] -0.6918140756  0.3020779657 -2.531617e-01
## [3120,]  1.3962984513  0.3270762369  7.775927e-01
## [3121,] -1.0799340712 -1.5227015791  1.614758e+00
## [3122,] -0.1834754994 -0.8521658705  5.037551e-02
## [3123,] -0.0283414020 -1.1443211808 -6.372413e-02
## [3124,] -1.0400372334 -1.4751802740  1.523209e+00
## [3125,]  1.4280135205  0.6982367495  1.164524e+00
## [3126,] -0.3672479725  0.4219906225 -4.734029e-01
## [3127,]  1.5853116691  0.1740929134  4.998571e-01
## [3128,] -1.3170748589  0.5810618518 -6.670588e-01
## [3129,]  1.6322467642 -0.6397037718 -8.423184e-01
## [3130,]  0.3089719035 -1.5542532526 -3.643801e-01
## [3131,]  0.1216510732  1.1648093226 -1.189338e-01
## [3132,] -0.6452108152  0.3118713991 -4.262025e-01
## [3133,]  0.2068399885  1.4499788176  1.550108e-01
## [3134,] -1.2609876812 -0.5201687552  6.254084e-01
## [3135,] -1.1887620806 -1.1110545591  1.288024e+00
## [3136,] -0.7889543854  0.5576308845 -4.949383e-01
## [3137,] -1.3165649569  1.3622539666 -1.566589e+00
## [3138,] -1.2116696457 -1.4884922199  1.761888e+00
## [3139,] -0.8186081116  0.4388572577 -4.936153e-01
## [3140,] -0.9926930751 -1.5261766248  1.483421e+00
## [3141,] -1.1994671841  0.6441615606 -6.873154e-01
## [3142,] -1.2032157118  1.4872142560 -1.630330e+00
## [3143,] -0.8151478970  1.4597342185 -9.963453e-01
## [3144,]  0.5728853350  0.2771849379 -6.079203e-02
## [3145,] -1.0058162815  0.1508117032 -2.318200e-01
## [3146,] -0.5325234446 -1.2975412660  6.552799e-01
## [3147,] -0.7435746468  0.5033483450 -4.748352e-01
## [3148,] -0.3505303172  1.1546024423 -6.003708e-01
## [3149,] -0.3546855267 -0.2882381517 -9.576685e-02
## [3150,] -1.1914371064  0.4974178495 -5.297088e-01
## [3151,]  0.0051137205 -1.5173796659 -5.824015e-03
## [3152,] -0.1672055636 -1.5434340085  2.829238e-01
## [3153,] -0.9223710174 -0.5692948994  4.605394e-01
## [3154,] -0.5514297209 -0.4358876879  6.395356e-02
## [3155,] -1.2782225583  1.3361121689 -1.432210e+00
## [3156,]  1.6180747177 -0.7653434232 -1.230681e+00
## [3157,] -0.6485209616 -1.5273737736  1.052111e+00
## [3158,] -0.5662298115  0.2702964133 -2.447043e-01
## [3159,]  0.1957071182  0.8650650567 -2.358919e-01
```

```
## [3160,] -0.1672393363 1.2952450095 -3.888696e-01
## [3161,] -0.2128090224 -1.4962738924 2.865954e-01
## [3162,] -0.7181263315 -0.4441661318 1.602496e-01
## [3163,] 1.2770188012 0.1145252932 1.407465e-01
## [3164,] 0.9141714086 -1.5721407893 -1.155678e+00
## [3165,] 0.8091604878 0.0339688064 -2.775770e-01
## [3166,] -0.2790354861 1.2981221504 -6.871283e-01
## [3167,] -0.3463925252 -1.4758629487 5.169652e-01
## [3168,] -0.3937505878 1.1585345745 -5.507358e-01
## [3169,] -0.5151640244 -1.5224082048 7.639407e-01
## [3170,] 1.1517463620 -0.7748593259 -7.911709e-01
## [3171,] -0.6745153542 0.7289589123 -7.038185e-01
## [3172,] 0.9366146062 -1.3650277738 -1.189415e+00
## [3173,] 1.7291483206 -0.7073798370 -1.066286e+00
## [3174,] 0.7447917313 0.5205850077 1.917862e-01
## [3175,] -0.0838980224 -1.5318230213 2.170753e-01
## [3176,] -1.1254137520 -1.4838663395 1.636092e+00
## [3177,] 1.2487822852 0.3373695505 3.230717e-01
## [3178,] 0.4168670881 0.9435776638 2.128481e-01
## [3179,] -1.1577853651 -0.8607480411 9.214644e-01
## [3180,] 1.5232634770 0.3338016935 6.530123e-01
## [3181,] -1.2218233589 -1.2891315066 1.527907e+00
## [3182,] 1.2608459986 -1.5425526130 -1.730110e+00
## [3183,] -0.0106246441 0.8641698178 -1.928661e-01
## [3184,] -0.9731893051 -0.3762443132 2.347493e-01
## [3185,] -0.6030481412 -1.5033815103 8.731107e-01
## [3186,] 1.4487180745 -0.5061691266 -6.598809e-01
## [3187,] -0.7581742570 -1.1548588619 8.453839e-01
## [3188,] 1.2681309262 -1.5721731638 -1.847176e+00
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## [3190,] 0.4827739117 -0.3484976828 -4.263778e-01
## [3191,] -0.9988609312 0.7613570086 -8.720374e-01
## [3192,] -1.1261969941 -1.4752050407 1.634919e+00
## [3193,] -0.4376362624 0.2577043733 -3.635573e-01
## [3194,] 0.1797376747 1.3621263638 1.158403e-02
## [3195,] 1.6661470342 -1.4095021489 -1.952415e+00
## [3196,] 0.7570636868 1.1866773206 3.487961e-01
## [3197,] 0.6781217269 0.3839578529 1.344064e-01
## [3198,] -1.2802313853 -0.1423327366 1.819584e-01
## [3199,] 1.5329404131 0.4447956086 1.196324e+00
## [3200,] 0.4773428592 -1.5218226560 -5.653658e-01
## [3201,] 1.4040760878 1.3678321612 2.264495e+00
## [3202,] -0.9946422580 -1.4860780689 1.433912e+00
## [3203,] -1.0374905940 -1.4984504095 1.514734e+00
## [3204,] 0.6314538353 0.1056492656 -9.276995e-02
## [3205,] -1.3548853529 1.3234431748 -1.538360e+00
## [3206,] 1.3214074938 -0.1328277623 -4.045627e-01
## [3207,] -0.5177494046 -1.4992456156 7.737039e-01
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## [3211,] 0.3028623154 0.4661112189 1.029222e-01
## [3212,] -1.2709479904 -0.3246053888 3.958840e-01
## [3213,] -1.1696135772 -1.4653165130 1.674749e+00
## [3214,] 1.4152972051 0.2389546188 4.996065e-01
## [3215,] -0.2266169745 -1.3417314560 2.612668e-01
## [3216,] 1.5065737487 0.1491619162 4.790582e-01
## [3217,] -1.1452289747 -1.1162853698 1.233429e+00
## [3218,] -1.2187013010 -0.5418632622 6.449466e-01
## [3219,] -1.1452237271 -1.1141036798 1.227809e+00
## [3220,] -1.0706958310 0.5497124633 -6.051854e-01
## [3221,] -0.8167460048 0.4071854642 -4.629889e-01
## [3222,] -0.9531527293 -1.4601408554 1.354726e+00
## [3223,] -0.8192886109 -0.1564359216 -5.665141e-02
## [3224,] 0.6988962215 1.1881236184 7.975632e-01
## [3225,] -0.9080667464 1.2397909971 -1.230982e+00
## [3226,] 1.4798575324 -1.5758057140 -2.020629e+00
## [3227,] -0.7668349299 0.8440287045 -7.193600e-01
## [3228,] 0.1933268110 -0.3821415689 -2.694495e-01
## [3229,] -1.1021753010 -1.1120114925 1.167556e+00
## [3230,] -0.2122897112 -1.5186706086 3.292146e-01
## [3231,] 1.2865450416 -0.8222366006 -9.857317e-01
## [3232,] -0.6506143344 -0.2185166765 -2.816083e-02
## [3233,] 1.5668355299 -1.5648409985 -2.181332e+00
## [3234,] -0.1255013716 -1.5234022475 2.129324e-01
## [3235,] -0.6364252166 -0.4326804063 1.369407e-01
## [3236,] 0.7330195003 1.2174501603 9.034838e-01
## [3237,] -1.2122498579 -1.4771001792 1.748518e+00
## [3238,] -1.0396107836 -1.4696621868 1.498136e+00
## [3239,] -0.4817075000 -0.7910052771 2.000292e-01
## [3240,] -0.9018363027 -0.2201155935 1.200412e-01
## [3241,] -0.4368950825 0.7578126218 -5.629748e-01
## [3242,] -1.1958583831 -0.1559365754 1.514537e-01
## [3243,] 1.4275126082 1.1728382403 2.138367e+00
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## [3253,] -0.5093845488 1.0857441213 -5.580114e-01
## [3254,] -1.2205662325 -1.3138142616 1.556876e+00
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## [3256,] -0.0948964703 0.5013626742 -2.958606e-01
## [3257,] 1.3991075033 0.4280605429 4.500451e-01
## [3258,] 0.0027928795 0.7973955515 -3.777826e-01
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## [3260,] -0.9872845882  1.1290099472 -1.023478e+00
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## [3263,]  0.7835365901 -1.5392099302 -1.034269e+00
## [3264,] -0.3724217358  0.4249650183 -3.448835e-01
## [3265,]  1.5438474935 -1.4141116363 -1.955783e+00
## [3266,] -1.2479612921  1.5584271019 -1.709638e+00
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## [3268,] -1.3313867594  0.8620655239 -9.968608e-01
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## [3279,]  1.7355693634 -1.5617427507 -2.318162e+00
## [3280,]  0.2527008523  0.6501495658 -1.174903e-01
## [3281,]  1.4229846995 -0.0687197359 -5.991987e-03
## [3282,]  0.0073933065  1.0351598171 -1.953075e-02
## [3283,] -0.6451986493  1.4098613263 -1.032038e+00
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## [3286,] -1.1125445783 -0.9197505613  9.570783e-01
## [3287,] -0.3147741786 -0.2666820335 -1.224632e-01
## [3288,] -1.1023507694 -0.3218863830  2.635979e-01
## [3289,] -1.1328016657  0.1591995870 -1.446751e-01
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## [3339,] -0.9489728506 0.5007104588 -4.519697e-01
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## [3341,] -1.2958809489 0.9407396007 -1.051260e+00
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## [3343,] 1.4141085986 1.0103224893 1.822464e+00
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## [3360,] -0.4293971887 -1.5148057252 6.435206e-01
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## [3375,] -1.3573029036 1.3709100113 -1.594070e+00
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## [3403,] -1.1429028989 -0.3235501138 2.571599e-01
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## [3407,] -1.2471360762 0.0120003362 8.343698e-04
## [3408,] -0.2086286842 0.8343817476 -2.961443e-01
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## [3410,] 1.3997111566 0.3430514163 6.477540e-01
## [3411,] -0.8534591681 0.3359953376 -3.956569e-01
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## [3414,] 1.3941741048 0.6025174312 1.217946e+00
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## [3747,] 0.9723916011 -0.2920540307 -5.194182e-01
## [3748,] -1.2297529254 -1.1334402829 1.345179e+00
## [3749,] -1.2121531559 -1.4789988526 1.750746e+00
## [3750,] -1.1977317637 0.6229736921 -6.796987e-01
## [3751,] -1.2206629345 -1.3119155881 1.554648e+00
## [3752,] 0.4006823838 0.0199588855 -2.708391e-01
## [3753,] -1.2692073538 -0.3587815111 4.359951e-01
## [3754,] -1.1030431336 1.0970489669 -1.130058e+00
## [3755,] -1.2337802467 0.5384588892 -5.963611e-01
## [3756,] 1.5676910688 0.3072156674 6.285583e-01
## [3757,] -0.6777548030 -0.4451708793 1.781390e-01
## [3758,] -1.2054038165 0.7880482739 -8.927702e-01
## [3759,] -0.7889794766 -1.2985003061 9.394515e-01
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## [3760,] -1.0502128064 -1.2823816115 1.306288e+00
## [3761,] -1.2812951077 -0.1214473285 1.574461e-01
## [3762,] 1.4195360044 1.1203551423 2.479890e+00
## [3763,] 0.8927991363 0.2909963504 1.078198e-01
## [3764,] 0.4572843497 -1.3261197249 -5.298098e-01
## [3765,] 1.2192341618 -1.5536595026 -1.684969e+00
## [3766,] -1.3262615518 0.7614358305 -8.787561e-01
## [3767,] -1.3571094996 1.3671126644 -1.589613e+00
## [3768,] -1.2221134650 -1.2834354862 1.521222e+00
## [3769,] 0.7619186895 0.4272672067 -2.394514e-02
## [3770,] 0.2379657115 1.0726209447 2.849408e-01
## [3771,] 0.4792631288 -0.3235698051 -3.967254e-01
## [3772,] 0.7874461462 -1.5608636743 -1.082629e+00
## [3773,] -1.1859723155 -0.3343690610 3.398901e-01
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## [3775,] 0.9821516143 -0.4361624910 -4.139037e-01
## [3776,] 0.0067599943 -1.5453163761 2.109154e-02
## [3777,] -0.8856061118 0.8622168226 -8.727472e-01
## [3778,] 1.2182424186 1.0449815108 1.501076e+00
## [3779,] -0.0047789468 1.2592566913 -2.626014e-01
## [3780,] -0.9827823171 1.0851632589 -1.031660e+00
## [3781,] -0.2459853469 0.4518941805 -5.063282e-01
## [3782,] 0.9289416668 0.7867506071 1.141877e+00
## [3783,] 0.7128145320 1.3000561541 1.227033e+00
## [3784,] -0.8645654916 -1.4967197581 1.271173e+00
## [3785,] -1.1668592923 -1.5075143168 1.708370e+00
## [3786,] -1.1008874396 0.3470950035 -3.790760e-01
## [3787,] -0.3367829658 0.9933904088 -5.566926e-01
## [3788,] -0.8656225279 -1.4823171563 1.262772e+00
## [3789,] -0.9857409056 -0.1987100916 1.186332e-01
## [3790,] -0.8784590924 0.7693668854 -8.273315e-01
## [3791,] -0.6751017728 -0.4334717118 7.901134e-02
## [3792,] 0.3855624740 0.4500306186 1.226107e-01
## [3793,] 0.2771434169 1.1419842537 1.574181e-01
## [3794,] -0.0519276265 0.0485256822 -2.875940e-01
## [3795,] 1.2862785488 0.6162227832 7.899557e-01
## [3796,] -0.6449871448 0.8603868334 -7.336348e-01
## [3797,] -1.2120564538 -1.4808975261 1.752975e+00
## [3798,] 1.0711605425 0.7643063512 6.896354e-01
## [3799,] -0.9591710899 0.7194516669 -7.334718e-01
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## [3801,] -0.6164871702 0.4237288372 -3.857022e-01
## [3802,] -0.4583480442 1.4802020324 -7.374761e-01
## [3803,] -1.1237255287 -1.5095194738 1.656167e+00
## [3804,] 0.9144490749 -1.5366960186 -1.252027e+00
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## [3808,] 1.3365346744 0.9994584060 1.735728e+00
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## [3810,] -1.2341055533  0.5657284150 -6.563220e-01
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## [3813,]  0.8793275073  1.2471453933  1.289294e+00
## [3814,]  0.6971389777 -1.1935428442 -7.082889e-01
## [3815,]  1.4230633510  1.2168320972  2.144786e+00
## [3816,] -1.3168814549  0.5772645049 -6.626021e-01
## [3817,] -1.1515396087  1.2878765123 -1.411292e+00
## [3818,]  1.5812552740  0.1801691699  5.912134e-01
## [3819,] -1.1551679023 -0.1582230204  1.641796e-01
## [3820,]  1.0026451261 -1.5700266264 -1.333459e+00
## [3821,] -1.1693016112 -1.4644504825  1.664373e+00
## [3822,]  1.5656249056 -1.5898729655 -2.086621e+00
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## [3824,] -1.2475850107  1.5312990844 -1.651372e+00
## [3825,] -0.3697181752  0.9283537952 -6.041241e-01
## [3826,]  0.7271218794  0.3570627120 -9.460734e-03
## [3827,] -0.8623099962  0.5238030580 -6.348588e-01
## [3828,]  1.0101026539  0.0415735244 -1.957942e-01
## [3829,] -0.2159694932 -1.5202173475  4.298236e-01
## [3830,]  1.3482172522 -0.3813039815 -4.849882e-01
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## [3832,] -0.3644151504  1.3175999427 -6.449211e-01
## [3833,] -0.6039843078 -1.4951447362  8.770238e-01
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## [3835,]  0.0511633304  1.0804305142 -2.072325e-01
## [3836,] -0.3041887114  1.1246613095 -6.667054e-01
## [3837,] -1.3104024188  0.4500533830 -5.132998e-01
## [3838,]  0.0402211142  0.7145379382 -7.688273e-02
## [3839,] -1.1921095793  0.5453948501 -6.325696e-01
## [3840,] -0.9667429874 -0.5490558316  4.994774e-01
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## [3859,] -1.2197926163 -1.3290036493  1.574703e+00
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## [3860,] -0.4458717175 -1.3026521471 5.435413e-01
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## [3869,] 0.1981552995 1.5493957315 1.335139e-01
## [3870,] -0.5340370525 1.3402089696 -5.493351e-01
## [3871,] -0.4422808814 -0.2207331502 -1.159832e-01
## [3872,] 1.3632651805 1.3091048718 2.408225e+00
## [3873,] -1.2618579995 -0.5030806940 6.053528e-01
## [3874,] -0.3083127551 0.6715072704 -4.963365e-01
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## [3880,] 1.4501811233 1.0298903628 1.901666e+00
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## [3882,] -1.3283889965 0.8032066467 -9.277807e-01
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## [3888,] 1.2383440783 1.4380807722 2.138147e+00
## [3889,] 1.1552879045 -1.4252252988 -1.403349e+00
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## [3892,] 0.8093111077 -1.3726928452 -1.053577e+00
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## [3899,] -1.1560406821 -0.9100827865 9.995534e-01
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## [3901,] -0.6164961508 1.0127737468 -7.888450e-01
## [3902,] 0.9328849676 1.4535605728 1.516003e+00
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## [3905,] -0.5510009633 -0.4411988059 6.602725e-02
## [3906,] 0.9412281640 1.4420476769 1.325627e+00
## [3907,] 1.8421727816 -1.4381721798 -2.201098e+00
## [3908,] 0.4366788539 -1.5346325704 -5.408597e-01
## [3909,] 1.0478012040 0.3860019829 1.010223e-01
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## [3910,] -1.2674671011  0.4084891300 -4.608984e-01
## [3911,] -1.3070178478  0.3835998119 -4.353061e-01
## [3912,] -0.5765985381  1.0126205117 -7.606381e-01
## [3913,] -1.1513127429  1.2668350779 -1.364391e+00
## [3914,]  1.50607779571  0.4204555576  8.870253e-01
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## [3917,] -1.3297428249  0.8297880751 -9.589782e-01
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## [3921,] -1.1259473361 -1.4615092457  1.593947e+00
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## [3924,]  1.2404422181  1.1669010718  1.687776e+00
## [3925,] -0.3217845238  0.2812555723 -2.382979e-01
## [3926,] -1.2839795498  0.7353949246 -8.481829e-01
## [3927,] -0.8643589842 -1.5026478520  1.280638e+00
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## [3938,] -0.8650597658 -1.4807549052  1.244055e+00
## [3939,] -1.1554817922 -0.9497066091  1.084413e+00
## [3940,] -0.9524635885 -0.0655429804 -1.409781e-02
## [3941,] -1.1144284542 -0.1452036738  1.371643e-01
## [3942,]  0.8872884801  0.6372205338  4.593480e-01
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## [3954,] -1.2004960025 -0.0647889286  4.435525e-02
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## [3960,] 1.4386868133 1.0348227579 2.191402e+00
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## [3975,] -1.0535815828 0.9327388579 -9.408137e-01
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## [3978,] 1.8422756321 -1.4248839285 -2.237187e+00
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## [3984,] -0.8290660163 1.1592625706 -9.521366e-01
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## [3988,] 0.7584927690 1.0692856619 6.061660e-01
## [3989,] -0.2058565531 0.4047060224 -3.660279e-01
## [3990,] -0.2156845402 -1.4825852266 3.277871e-01
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## [3992,] 0.4422254969 -0.3848250587 -3.458250e-01
## [3993,] -1.2663049066 0.3965455743 -4.614398e-01
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## [4018,] -0.9632858467 -1.3018982918 1.223508e+00
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## [4024,] -1.1047861965 -0.3264801079 3.391543e-01
## [4025,] 1.4309234489 1.1324630627 2.150151e+00
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## [4039,] -0.7703353736 0.3731017043 -5.207299e-01
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## [4065,] -0.6109623464 -0.8192572280 4.388803e-01
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## [4563,] -0.9493146324 -1.5275025423 1.423080e+00
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## [4565,] 0.9726156047 1.1347642578 1.272623e+00
## [4566,] 1.8682336436 -1.5500315374 -2.605073e+00
## [4567,] 1.4542027925 0.9933779931 1.887690e+00
## [4568,] -1.0927048877 -1.2872636071 1.358927e+00
## [4569,] -0.5603926717 -1.5088815538 8.422607e-01
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## [4572,] -0.1083844578 0.5809440637 -1.412684e-01
## [4573,] 1.8292193894 -1.5994369980 -2.531989e+00
## [4574,] 1.2577992054 -1.5293394149 -1.683222e+00
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## [4710,] 0.0722257191 1.5108707567 3.107703e-01
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## [4753,] 1.3536839035 0.1163650821 2.740434e-01
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## [4808,] 0.2230973905 0.1851633360 -3.241983e-01
## [4809,] 0.9001465461 0.1922013383 1.629046e-01
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## [4827,] 1.6317569791 -1.4200651720 -2.098464e+00
## [4828,] 1.1808832893 1.0218419691 1.464666e+00
## [4829,] -0.3356134833 0.5592656643 -5.732730e-01
## [4830,] -1.3083716762 0.4101812404 -4.665036e-01
## [4831,] 1.2373112256 1.1712120399 1.759243e+00
## [4832,] -1.0699726519 0.5127118364 -5.312342e-01
## [4833,] 0.5589495785 -1.0948989231 -5.534048e-01
## [4834,] -0.4287465556 1.1267854114 -6.276312e-01
## [4835,] -0.9431174909 -0.2108004876 1.051833e-01
## [4836,] 1.7385509404 -1.5599671356 -2.400994e+00
## [4837,] 0.3489587258 -1.5173177585 -4.316993e-01
## [4838,] -0.4416331269 -0.8145061637 2.822483e-01
## [4839,] -1.0589595903 0.3439093005 -3.966150e-01
## [4840,] 0.1579578790 0.3774658090 -1.716757e-01
## [4841,] -1.1941650939 1.2847913042 -1.359661e+00
## [4842,] 0.4131972040 -0.4801912332 -4.197500e-01
## [4843,] 0.7642332779 1.0223750066 5.731346e-01
## [4844,] -1.2265881322 0.4197286701 -4.871094e-01
## [4845,] 1.7391853675 -1.5538716947 -2.432984e+00
## [4846,] 0.7411015326 0.8371888999 5.698813e-01
## [4847,] -0.5427765177 -0.5483947416 1.191656e-01
## [4848,] 1.1455093328 1.0367201852 1.280560e+00
## [4849,] -0.1417898381 0.9216338003 -1.191531e-01
## [4850,] -0.4011537193 -1.3305991153 5.148732e-01
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## [4852,] 1.0771186711 1.1614850264 1.688219e+00
## [4853,] -0.7436975335 -0.7509817557 5.266978e-01
## [4854,] 0.6791395966 -0.2647454519 -4.156143e-01
## [4855,] -1.2691177217 0.4472493850 -5.148926e-01
## [4856,] 1.2173170022 -1.5221405380 -1.713764e+00
## [4857,] 1.3827941039 1.2376248833 2.074493e+00
## [4858,] -1.0147694503 -0.4154358161 3.496169e-01
## [4859,] -0.6731046046 0.0549533562 -1.240671e-01
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## [4860,] -0.0492121810  1.2338161180 -1.072881e-01
## [4861,]  0.0764037432  1.1587800086  9.009362e-03
## [4862,] -0.7136524855  0.7008835629 -6.810936e-01
## [4863,]  0.6588037525 -0.0849822695 -3.327217e-01
## [4864,]  1.0288551797  0.1929315115  7.556055e-03
## [4865,]  1.5574794113  0.3763881850  7.231833e-01
## [4866,] -0.9505645037 -1.5158023807  1.426538e+00
## [4867,]  0.1716970415  0.6254297294 -7.926077e-02
## [4868,]  0.4603498339  1.6634181640  4.909767e-01
## [4869,] -1.0172402779  1.6223062428 -1.475445e+00
## [4870,] -0.1267517398  0.3699761040 -2.049815e-01
## [4871,] -0.0356424553 -0.1749891721 -1.540935e-01
## [4872,]  0.5525131537  0.0671526611 -7.415718e-02
## [4873,]  0.9104864735 -1.5303593869 -1.163790e+00
## [4874,] -0.2088519767  0.4679056383 -4.460751e-01
## [4875,]  1.4132866155 -0.2642901295 -3.362594e-01
## [4876,] -0.9286140957 -1.1388547057  9.790634e-01
## [4877,]  0.2584470821  0.9777795210 -1.513318e-02
## [4878,]  1.4270060686  1.1735991875  2.149770e+00
## [4879,] -0.9528504522 -1.4961428013  1.437232e+00
## [4880,]  0.3918309292 -1.5135476505 -4.915363e-01
## [4881,]  0.3429393882  1.3303631147  1.077515e-01
## [4882,]  0.4286509662  1.5237972827  5.984326e-01
## [4883,]  0.7554360656  0.7946315130  3.000190e-01
## [4884,] -1.1751415344  0.2327565438 -2.931059e-01
## [4885,] -0.5642445140  0.7933624851 -5.345023e-01
## [4886,] -1.2167537938 -0.5472925126  6.073968e-01
## [4887,]  0.9989605206  0.0539849438  6.589422e-02
## [4888,]  0.4167758555  0.6294790944 -7.214655e-02
## [4889,] -0.2982553296 -0.4570413535 -7.840454e-02
## [4890,] -0.6307594517 -1.1295478197  6.622870e-01
## [4891,] -1.1351617056 -1.2833792205  1.388615e+00
## [4892,] -1.2134752746  0.9260086218 -1.027222e+00
## [4893,]  0.1266255226  0.7000720007 -1.586170e-01
## [4894,] -1.3178484752  0.5962512395 -6.848860e-01
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## [4898,]  1.2617754477 -1.5594765246 -1.712021e+00
## [4899,]  1.5004063633  0.6947179345  1.423580e+00
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## [4901,] -0.3092242823  1.4722043497 -3.309782e-01
## [4902,]  0.7027490979  0.5147835757  2.349215e-01
## [4903,] -0.1560546031  0.7523943117 -3.955389e-01
## [4904,]  1.5545551950  0.3639361937  8.313305e-01
## [4905,]  0.0720307510  0.8934745214 -2.860264e-01
## [4906,] -0.7857328079  0.5514042619 -5.639737e-01
## [4907,]  1.6029555992  0.0540376577  3.377120e-01
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## [4909,] -1.2859625262  0.7732325459 -8.911231e-01
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## [4910,] -0.6037481164 -1.5139931599 9.181701e-01
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## [4913,] 1.8266267541 -1.5632918153 -2.554652e+00
## [4914,] 0.1637522684 1.1772746913 -1.803508e-01
## [4915,] 1.2175286135 -0.3160156946 -4.434592e-01
## [4916,] 0.8837632048 -0.5824374239 -6.898568e-01
## [4917,] -1.2425175934 -0.8828153861 1.051031e+00
## [4918,] 1.1258576266 1.1750401162 1.449591e+00
## [4919,] 1.2565212136 -0.3143470379 -3.960413e-01
## [4920,] 0.0466587452 -1.5584691856 8.192854e-02
## [4921,] -1.1352402032 -0.5059876500 5.140998e-01
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## [4923,] -1.2595371508 -0.5486488571 6.588342e-01
## [4924,] -0.8130813702 1.5391531424 -1.250195e+00
## [4925,] -0.2667112707 0.6067361396 -3.505706e-01
## [4926,] -1.1581635948 -0.0841885391 5.691800e-02
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## [4931,] -0.6980460800 1.0060419640 -7.814538e-01
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## [4934,] -1.1248128496 -1.4908666987 1.637884e+00
## [4935,] -1.1463114948 -0.3243440288 3.487493e-01
## [4936,] 1.5181305565 0.3672291834 7.039482e-01
## [4937,] -0.8320320437 -1.3309437016 1.076068e+00
## [4938,] -0.3876507783 -1.5033252539 5.939036e-01
## [4939,] -1.2079985223 0.8090178525 -8.772521e-01
## [4940,] -0.3568926245 1.2452965283 -6.609964e-01
## [4941,] -1.1550918590 -0.1493434317 1.398718e-01
## [4942,] -1.1055671308 -0.3286480143 3.651277e-01
## [4943,] -1.2291628949 1.2118617278 -1.333047e+00
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## [4952,] -1.2123465599 -1.4752015057 1.746289e+00
## [4953,] 0.6153221887 0.9074371047 4.699084e-01
## [4954,] -0.5370867463 -0.6214517144 1.531574e-01
## [4955,] -0.6567327557 0.4770941436 -5.384520e-01
## [4956,] 0.5773033753 0.2092660757 -6.281659e-03
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## [4958,] -1.0555476708 -0.4437326527 4.160343e-01
## [4959,] -0.5095696960 -0.4175904509 -5.776183e-03
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## [4960,] -1.2117137069  0.1662920582 -2.413525e-01
## [4961,]  1.5392737469 -0.5697904075 -7.272338e-01
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## [4963,] -0.9603660716 -1.3241325869  1.202623e+00
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## [4970,] -0.2150696337 -1.4787110980  3.018910e-01
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## [4976,]  0.4096499895 -0.8905686460 -3.720146e-01
## [4977,]  0.4228756246 -0.2153275114 -2.630574e-01
## [4978,]  1.5614302534  0.3180079729  7.660092e-01
## [4979,] -0.8767479656  0.6917663962 -6.773460e-01
## [4980,]  1.8044830981 -1.4362238857 -2.291850e+00
## [4981,] -0.1232098751 -1.5365450587  1.857202e-01
## [4982,] -0.9727681936 -1.1223450609  1.021644e+00
## [4983,] -1.0500976627 -0.5347921971  5.015578e-01
## [4984,]  0.89444498979  1.1742682973  1.074898e+00
## [4985,]  0.9178787082 -1.2198312765 -1.061732e+00
## [4986,]  1.6510491106 -0.1982005221 -2.927050e-01
## [4987,] -0.6746328592  1.2375190274 -9.018999e-01
## [4988,] -1.0728466369  0.5632458373 -5.826525e-01
## [4989,]  0.5775259573  0.2293880737 -6.268647e-02
## [4990,] -1.2176151182 -0.5475164629  6.305994e-01
## [4991,]  1.0261425600  1.2392400044  1.756245e+00
## [4992,] -0.5598147673 -1.5094443894  8.284845e-01
## [4993,] -1.0587921519 -0.3855586754  3.551599e-01
## [4994,] -0.5243947738 -0.2463674971 -4.627765e-02
## [4995,]  1.6290070090 -0.8346825534 -1.343829e+00
## [4996,] -0.9060546198  0.5067754633 -5.187823e-01
## [4997,]  1.1178819067  1.2677566684  1.426293e+00
## [4998,]  0.1397747197  1.3165886371  9.988798e-02
## [4999,] -0.6965790582 -0.2070334047  7.464067e-02
## [5000,] -0.1734106627 -1.4934788301  3.205180e-01
## [5001,] -0.9942915827 -1.5002744360  1.460361e+00
## [5002,]  1.1571778600  1.3348936817  2.377785e+00
## [5003,]  1.0944080687  0.5926261199  5.099018e-01
## [5004,]  0.3350322690  0.9295536476  2.460486e-01
## [5005,] -0.7342346889 -1.4893192533  1.056427e+00
## [5006,] -0.2976866695 -0.9860202667  1.591181e-01
## [5007,]  1.6687932361 -0.6058174669 -8.115473e-01
## [5008,]  0.0745214710  0.0234791879 -3.187897e-01
## [5009,] -1.0385217240 -1.4926443799  1.527250e+00
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## [5010,] 0.4711710462 -1.0083983293 -6.165306e-01
## [5011,] 1.8719940529 -1.5764335639 -2.637583e+00
## [5012,] -0.8315617922 1.2693587985 -1.163140e+00
## [5013,] 0.5244071693 -1.5367547973 -6.884050e-01
## [5014,] -0.4295575044 0.6936642738 -5.946774e-01
## [5015,] 1.3970320462 1.1102815857 2.020185e+00
## [5016,] -1.3093386965 0.4291679750 -4.887875e-01
## [5017,] 1.8441850304 -1.4065806250 -2.333360e+00
## [5018,] -1.0998821531 0.3802254336 -4.887364e-01
## [5019,] -0.2567723874 -1.5074073552 3.936133e-01
## [5020,] -0.9721851786 0.9303759594 -9.213202e-01
## [5021,] 1.4465761667 1.1520773150 1.689441e+00
## [5022,] -1.0178254747 -0.3589057973 2.879192e-01
## [5023,] -1.1547037942 1.2985967023 -1.355055e+00
## [5024,] -1.0488400098 1.5306372578 -1.491068e+00
## [5025,] -0.8989727090 1.0461570688 -9.835356e-01
## [5026,] -1.2108960295 -1.5036816076 1.779715e+00
## [5027,] 0.7912693682 -1.2125666009 -9.816494e-01
## [5028,] -0.5494998893 0.5937435999 -4.205446e-01
## [5029,] -0.7278885946 0.8694072738 -7.302946e-01
## [5030,] -1.2861905932 0.7769336672 -8.944271e-01
## [5031,] -0.8195748374 -1.5174084549 1.217102e+00
## [5032,] -1.2878229573 0.7702350340 -8.346908e-01
## [5033,] -0.5911391691 1.2583152611 -9.957182e-01
## [5034,] -0.3895003824 -1.4824543639 5.900846e-01
## [5035,] -0.4291245327 -1.5075474538 6.181182e-01
## [5036,] -0.6168133014 1.0400659139 -8.490772e-01
## [5037,] -0.5319158531 1.5173001721 -1.050012e+00
## [5038,] 0.0625731906 0.5208678000 -1.778322e-01
## [5039,] -1.2606975752 -0.5258647756 6.320935e-01
## [5040,] 0.2567620218 0.2738960786 -3.554735e-01
## [5041,] 0.7604266837 0.9706324177 8.031882e-01
## [5042,] -1.2124432619 -1.4733028323 1.744061e+00
## [5043,] 1.2148184431 1.0723174917 1.522397e+00
## [5044,] 0.8224418243 1.1701867581 8.248236e-01
## [5045,] -0.5386977252 -0.5695786783 6.517683e-02
## [5046,] -0.7132933854 0.6758749718 -6.277013e-01
## [5047,] 1.5357659354 -0.5166816909 -7.684607e-01
## [5048,] 1.0260230205 -1.3776558326 -1.354727e+00
## [5049,] 1.5648477317 0.3881744607 4.998955e-01
## [5050,] -0.9928477809 0.5743402656 -5.602345e-01
## [5051,] -0.0463350134 -0.5271859531 -6.471510e-02
## [5052,] 0.0388262043 1.1610396208 -8.547271e-02
## [5053,] -0.5132080477 -0.9517468374 3.553355e-01
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## [5055,] 0.3117069640 -0.3212316734 -3.045089e-01
## [5056,] -0.5206375927 0.7059859404 -3.846558e-01
## [5057,] -1.2087991903 -0.7094155996 8.056262e-01
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## [5059,] 0.5273832112 -0.4005847488 -3.915395e-01
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## [5060,] -0.0952386880  0.0955482218 -3.438323e-01
## [5061,]  1.8208873518 -1.5445506782 -2.450877e+00
## [5062,] -1.1971894545  0.5941394523 -6.215105e-01
## [5063,]  0.0449777218  0.6930685221 -1.479706e-01
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## [5065,] -0.4875968655  1.5120838795 -1.125301e+00
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## [5067,]  0.8743268411 -1.5566704419 -1.223761e+00
## [5068,]  0.3067465328  0.8709227989  6.031209e-02
## [5069,] -0.0636489164  1.0099211740 -2.418379e-01
## [5070,] -0.9515731732 -1.4947641438  1.400195e+00
## [5071,]  1.2819316998  0.8854942180  1.304228e+00
## [5072,] -0.7947914257  1.2540228302 -1.014588e+00
## [5073,]  1.3084560307  0.6513954963  1.195183e+00
## [5074,]  0.8415098112  0.0432009175 -7.454305e-02
## [5075,] -0.3409321962 -1.5062144165  4.496952e-01
## [5076,]  0.2996355061  0.1931519717 -2.030118e-01
## [5077,] -0.3026901828 -1.4806239519  4.567414e-01
## [5078,]  0.3688058408 -0.8258622417 -5.375244e-01
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## [5082,] -0.9862710753 -0.2153517211  1.743789e-01
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## [5084,] -1.0185790921 -1.0974320295  1.086662e+00
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## [5087,]  1.2476333839  0.5830117861  8.126521e-01
## [5088,]  1.0282674769 -0.7502358875 -8.369843e-01
## [5089,]  1.5014823985  0.4272021961  9.908693e-01
## [5090,]  0.0078131648  1.0926705418 -1.750559e-01
## [5091,] -1.2404314275  0.6673592523 -7.453825e-01
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## [5093,] -1.3190088995  0.6190353210 -7.116267e-01
## [5094,] -0.7361142765  1.6480202664 -1.393730e+00
## [5095,]  1.4356224271  1.1325048883  2.026534e+00
## [5096,] -0.2311946961  0.6789387308 -3.889940e-01
## [5097,] -0.4749631392 -1.5000483197  7.276144e-01
## [5098,]  0.1973606627  1.1163198766  1.659252e-01
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## [5100,]  0.6382955907 -0.2715536881 -4.014554e-01
## [5101,] -0.3389361845 -0.4482268196 -1.077845e-01
## [5102,]  1.4085488795 -0.1322450859 -5.434764e-01
## [5103,] -1.0288388718  0.4943190302 -4.896950e-01
## [5104,]  0.5335823174  0.6036697093  1.520308e-01
## [5105,] -0.9527959685 -1.4894901852  1.419086e+00
## [5106,]  1.3731389341  1.2324929522  2.341172e+00
## [5107,]  0.6672775385  0.5185552305  8.128492e-02
## [5108,]  0.5675352704 -0.0406767568 -1.981040e-01
## [5109,] -1.3095321006  0.4329653219 -4.932443e-01
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## [5110,] 1.4131394133 -0.3145425827 -2.061366e-01
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## [5112,] -1.1560489253 0.5996037274 -6.400870e-01
## [5113,] -1.0158136206 -0.3771591520 2.808971e-01
## [5114,] -0.1498340916 0.2651106422 -4.113296e-01
## [5115,] -0.1727735527 -0.4674361914 -1.209849e-01
## [5116,] -0.7437861015 0.5114298272 -4.895809e-01
## [5117,] -0.1702027890 -1.5062448622 2.682723e-01
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## [5122,] -0.8398678737 0.7742555354 -7.774532e-01
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## [5125,] 1.6046535902 -0.1814117926 -1.919094e-01
## [5126,] -0.4531640860 1.4772559383 -8.663346e-01
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## [5130,] 0.7331389786 1.5272928960 1.198428e+00
## [5131,] 1.4082757029 1.0331383295 1.918459e+00
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## [5134,] -1.0364886106 -1.5130058402 1.524966e+00
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## [5143,] -1.1689794818 -1.4787260941 1.691772e+00
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## [5160,] 1.0010105150 0.0271689789 7.938224e-02
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## [5165,] 1.0850252258 -1.5566560111 -1.379351e+00
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## [5168,] -0.3879394145 -1.4911237860 5.708355e-01
## [5169,] -0.2016026878 -0.6012576976 -1.035302e-01
## [5170,] 0.0915430162 0.6550798690 -1.999663e-01
## [5171,] 0.6861044944 1.3129803026 8.201051e-01
## [5172,] -1.2240557972 0.3812489686 -4.569959e-01
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## [5175,] -0.7457332997 -1.3110290104 9.107335e-01
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## [5210,] -0.8328840425 -1.3289746412 1.093516e+00
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## [5359,] 1.2872218121 0.3743439325 2.963255e-01
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## [5365,] 1.4247267422 1.0116263088 1.540091e+00
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## [5372,] -1.2869941938 0.8007083065 -9.330355e-01
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## [5414,]  1.4916606313 -0.2837117933 -1.944643e-01
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## [5419,] -0.1140930233  0.7211296558 -3.434193e-01
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## [5422,] -0.9444706426  0.4265238830 -3.839248e-01
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## [5431,] -0.1080163507  1.1103563594 -4.045028e-01
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## [5493,] -0.5291413872 -1.3119908790  6.026856e-01
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## [5902,] -1.0845104024 0.0371502798 -3.084493e-02
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## [5913,] -0.2567387760 0.5282312069 -4.154627e-01
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## [5916,] 1.4346717669 -1.5318203086 -2.019961e+00
## [5917,] -0.5211984089 0.2345509794 -2.620175e-01
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## [6170,]  1.0918476021 -1.5832263785 -1.491922e+00
## [6171,] -0.9520999117  1.2804747017 -1.252315e+00
## [6172,]  1.2425061843  0.9909798865  9.989765e-01
## [6173,]  1.0355873347  0.9169398321  1.241202e+00
## [6174,]  1.5325029619  0.4717538162  1.140093e+00
## [6175,]  0.5303744140 -0.3922810448 -4.910253e-01
## [6176,]  0.3983368313 -0.3329046053 -3.991865e-01
## [6177,]  0.5827954570  1.1747167246  6.533630e-01
## [6178,]  0.4352861983  1.4295266027  6.608701e-01
## [6179,] -0.9088014496 -1.4847716048  1.327366e+00
## [6180,] -0.4743791179 -1.5005941744  7.136349e-01
## [6181,]  1.5217193112  0.5826809034  1.144850e+00
## [6182,] -1.3290659107  0.8164973609 -9.433794e-01
## [6183,]  0.4351301957 -0.3546780972 -2.350660e-01
## [6184,] -0.6160198460  0.4748699622 -5.264721e-01
## [6185,] -0.8930116439  1.5910956493 -1.432789e+00
## [6186,]  1.3965394157  0.3624191215  6.824639e-01
## [6187,] -1.1898982987  0.4778512983 -5.209976e-01
## [6188,]  1.3215499861  1.1767396413  1.684201e+00
## [6189,] -0.6002352052 -0.3651096934  9.245309e-02
## [6190,] -0.1863211260 -1.3169408265  2.163374e-01
## [6191,]  0.3566399071  0.7749922420  6.641036e-02
## [6192,]  1.3040466857 -1.5790459449 -1.697424e+00
## [6193,] -1.1646046685  0.7947319829 -9.054372e-01
## [6194,] -0.5021635867  0.5470596860 -4.709604e-01
## [6195,]  1.3389124406  1.0103934289  1.645755e+00
## [6196,] -0.7039997238 -1.3082526576  8.833219e-01
## [6197,]  0.2974539551  0.9794878000  3.181000e-02
## [6198,]  0.6927576672  0.8767415325  6.646974e-01
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## [6200,]  1.1280452137  0.3457660324  2.459583e-01
## [6201,] -0.0146698882 -1.3555875561  1.077033e-01
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## [6203,] -1.1780866190  0.9761848813 -1.006944e+00
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## [6211,] -1.2230804853 -1.2644487516 1.498938e+00
## [6212,] -0.8983968846 -0.2452415827 9.276233e-02
## [6213,] -0.1244667327 -1.5226971692 1.839655e-01
## [6214,] 1.2873025664 0.5518847066 9.246816e-01
## [6215,] -1.0594198337 0.3361302787 -3.649736e-01
## [6216,] 0.7023861886 0.5289459807 2.088791e-01
## [6217,] 1.4568535150 1.0159063657 1.761416e+00
## [6218,] 1.5398549392 -1.3840198092 -1.926441e+00
## [6219,] -1.2196266091 -0.4945881424 5.504949e-01
## [6220,] 1.5685618137 -0.2140358439 -2.378034e-01
## [6221,] 1.5498236244 0.3789737466 9.179196e-01
## [6222,] -1.2121531559 -1.4789988526 1.750746e+00
## [6223,] -1.3211363442 0.6608061371 -7.606513e-01
## [6224,] -1.2077677881 1.5330898054 -1.625936e+00
## [6225,] -1.1264902774 -1.4565151062 1.595671e+00
## [6226,] 1.2385911304 -1.3876208230 -1.534390e+00
## [6227,] -0.3566777790 -0.7939865518 1.507053e-01
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## [6231,] 1.4802593876 0.7904876524 1.712532e+00
## [6232,] -1.3538216305 1.3025577667 -1.513848e+00
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## [6240,] 1.1729766746 -0.2746050049 -4.529820e-01
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## [6242,] 1.3648356633 0.8244698194 1.431476e+00
## [6243,] -1.2106059234 -1.5093776280 1.786400e+00
## [6244,] 0.8358120915 -0.9184863464 -7.382376e-01
## [6245,] 1.0686826621 -0.7684564208 -7.769896e-01
## [6246,] 1.0221637876 0.8843971842 5.992695e-01
## [6247,] 1.3132894875 1.1754793759 1.904494e+00
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## [6260,] -0.3028101831 -1.4766228331 4.498432e-01
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## [6267,] 1.2192588648 -0.0168712420 -1.639756e-01
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## [6322,] -0.4548181342 0.9832820185 -6.583342e-01
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## [6325,] 0.9716700810 1.1256380775 1.320405e+00
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## [6327,] -0.7680812425 0.3208469631 -4.486956e-01
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## [6329,] 0.8007601978 1.0388700554 6.481132e-01
## [6330,] -1.2125399640 -1.4714041588 1.741833e+00
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## [6333,] -0.8882538498 1.4396021870 -1.177237e+00
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## [6339,] -0.7295169569 0.2606471756 -2.345820e-01
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## [6351,] 0.8908150532 0.3570034898 -5.864068e-03
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## [6357,] -1.1297120295 1.5691298268 -1.615117e+00
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## [6360,] -1.3145415009  1.3201944737 -1.514105e+00
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## [6363,] -0.2267043194 -1.3224698282  2.151700e-01
## [6364,] -1.0816127001 -1.5056902996  1.616142e+00
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## [6373,] -1.2111861355 -1.4979855872  1.773030e+00
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## [6377,] -1.2481555026  1.5947290453 -1.795737e+00
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## [6379,]  0.1462490489 -0.2523892872 -4.345293e-01
## [6380,] -1.2128300701 -1.4657081384  1.735147e+00
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## [6382,]  1.3713354680  1.0241643902  1.835449e+00
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## [6384,]  1.2156736519 -0.6350104494 -6.697931e-01
## [6385,] -0.3388786560  1.0374164991 -6.122180e-01
## [6386,] -0.9932269039 -0.0699600945 -8.067295e-03
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## [6393,] -1.1955802107 -0.1573314795  1.476465e-01
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## [6402,]  1.1967146808  0.3882561518  4.872909e-01
## [6403,] -1.2676593356  0.4144568462 -4.708387e-01
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## [6407,]  1.1571701150 -0.7446329047 -1.009675e+00
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## [6409,]  0.7351510394  0.3295081816 -1.512794e-01
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## [6410,] -0.0984978381  0.5282062064 -2.686401e-01
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## [6412,] -0.0597042215  0.5119854980 -1.710469e-01
## [6413,] -0.4858679517  0.3127382678 -3.105847e-01
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## [6418,]  0.4175363556 -0.5244907479 -4.225070e-01
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## [6437,] -1.2273736228  1.1734863752 -1.283664e+00
## [6438,]  0.9674775630  0.6575115293  4.536606e-01
## [6439,]  1.0896793279  0.2829906130  3.355910e-01
## [6440,]  0.8948502525  1.0973632943  1.257590e+00
## [6441,] -1.2111861355 -1.4979855872  1.773030e+00
## [6442,] -0.0840153832 -1.5191460856  1.883108e-01
## [6443,]  1.1595842036  1.3610778930  2.248750e+00
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## [6445,]  0.4722390633  1.0640108744  6.078818e-01
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## [6454,] -1.3170781511  1.3846676638 -1.609411e+00
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## [6465,] -1.3559490752 1.3443285828 -1.562872e+00
## [6466,] -0.9944121836 -1.5049434737 1.475262e+00
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## [6468,] 0.8617250544 -0.1412313026 -1.425352e-01
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## [6471,] -1.2797478752 -0.1518261039 1.931004e-01
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## [6489,] 0.6674759839 1.1272926299 6.997446e-01
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## [6520,] 1.7791496665 -1.5625082955 -2.385216e+00
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## [6610,] -0.3222404072  0.8343859039 -5.394626e-01
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## [6632,] -0.1324272985 -0.4360042664 -1.839246e-01
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## [6640,] -0.3878974965 -1.5040101538  6.021093e-01
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## [6676,] 0.5861489877 -0.5347316943 -5.226378e-01
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## [6683,] 0.3276702403 0.2922613527 -1.123755e-01
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## [6707,] -1.2345433677 0.5580116568 -6.254266e-01
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## [6711,] 1.4740640723 0.3536423349 8.198404e-01
## [6712,] 0.6394443014 0.3853312563 7.106128e-02
## [6713,] 1.2505638596 1.0931444214 1.607034e+00
## [6714,] 0.7413468803 -1.5345840404 -1.013465e+00
## [6715,] 1.2962350637 -0.0120007136 -4.647024e-02
## [6716,] 0.3484424973 -1.5534247877 -3.274154e-01
## [6717,] -1.2694282492 0.4377188584 -4.827860e-01
## [6718,] -0.7501662486 -0.5630625573 2.246021e-01
## [6719,] 1.4070507583 1.2699009763 2.432347e+00
## [6720,] 1.4486117146 0.0432098176 1.157220e-01
## [6721,] -0.6051987098 -1.5158529455 9.609714e-01
## [6722,] -0.2127254867 -1.5263817064 3.600422e-01
## [6723,] -0.4182150281 0.9371420156 -4.279946e-01
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## [6727,] 1.6475506731 -1.5430896379 -2.204516e+00
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## [6732,] -0.9121270935 1.3065357080 -1.291945e+00
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## [6739,] -1.3377690935 0.9873779723 -1.143935e+00
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## [6741,] 0.5571268762 -1.0241095393 -6.833454e-01
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## [6763,]  0.1014256364  0.9248447020 -6.095454e-02
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## [6769,] -0.0713494613 -0.6395821166 -2.013581e-01
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## [6774,] -0.4433501466 -1.3346603630  5.576789e-01
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## [6776,] -0.8436206427 -0.4381403340  2.141362e-01
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## [6957,] -0.3713327260 0.9433758359 -5.994268e-01
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## [6974,] 0.0734199297 -1.3480377480 -7.364397e-02
## [6975,] 0.2798843826 -0.8465563299 -3.012939e-01
## [6976,] -0.1837963557 1.0546284569 -4.256766e-01
## [6977,] -0.0273103602 1.4979385517 -2.700249e-01
## [6978,] -0.3997019312 0.2412653750 -2.428294e-01
## [6979,] -0.5420557775 0.4930499143 -3.632314e-01
## [6980,] 0.0595104158 0.9779092765 -1.690625e-01
## [6981,] -1.0767243792 1.3214220567 -1.309028e+00
## [6982,] 1.4408838830 0.8527697069 1.514510e+00
## [6983,] 0.6481300642 0.6669434194 2.117673e-01
## [6984,] 0.5966683930 -1.3802719397 -8.278755e-01
## [6985,] 0.9284596256 0.6579396576 4.016408e-01
## [6986,] 0.3578646642 0.0228413936 -2.291481e-01
## [6987,] -0.2533521974 0.4466133523 -2.994232e-01
## [6988,] -0.8365199730 0.7228700221 -7.363524e-01
## [6989,] -1.1564283596 -0.9003233837 9.852241e-01
## [6990,] 1.6508174088 -1.5448566549 -2.285943e+00
## [6991,] -1.1847341092 -0.3526029717 3.531545e-01
## [6992,] 1.1352378810 1.0667185093 1.475177e+00
## [6993,] -0.1774983245 -0.9699345680 1.891461e-01
## [6994,] 0.1318316565 1.0001971593 2.703920e-02
## [6995,] -0.2571150012 -1.5386981781 4.812335e-01
## [6996,] 0.1883601502 1.3210490456 -1.118554e-01
## [6997,] 1.6550185095 -0.2977045443 -1.470479e-01
## [6998,] -1.2374939965 0.5909959125 -6.307386e-01
## [6999,] -0.4322810931 0.6492623984 -4.115332e-01
## [7000,] -1.3173649650 0.5867578722 -6.737440e-01
## [7001,] -1.1661957745 0.0322096242 -2.439356e-02
## [7002,] 1.1525846077 0.4720132827 3.602887e-01
## [7003,] 0.2208120566 0.9300357345 1.752366e-02
## [7004,] 0.2774863953 0.7835815033 -2.768055e-02
## [7005,] 0.0070404822 0.7116665690 -2.740464e-01
## [7006,] -1.2699809701 -0.3435921234 4.181679e-01
## [7007,] 0.9564200748 -1.5202578328 -1.320003e+00
## [7008,] -1.3100156107 0.4424586892 -5.043862e-01
## [7009,] 0.4347843605 -1.5290561514 -5.050731e-01
```

```
## [7010,] -0.7331587641 -1.5253406432 1.118646e+00
## [7011,] -0.8299583468 -0.0343569905 -8.290716e-02
## [7012,] 1.4592061183 0.9725934769 1.808396e+00
## [7013,] 1.1074846538 1.0290700287 1.222728e+00
## [7014,] 0.4192389276 0.6211468292 -1.159545e-01
## [7015,] -0.6702397929 1.2063719161 -9.391179e-01
## [7016,] -0.9198235087 -0.5947297438 4.574803e-01
## [7017,] -0.8197105748 0.4596351195 -5.168391e-01
## [7018,] 1.4909360454 -0.2228767265 -3.282598e-01
## [7019,] -1.0471118020 -0.5741800144 5.220320e-01
## [7020,] -1.1687257773 -1.4801889222 1.688778e+00
## [7021,] 0.9651576169 -0.2774619154 -3.659341e-01
## [7022,] -1.3198792178 0.6361233821 -7.316822e-01
## [7023,] 0.2237684250 0.1458508315 -2.430682e-01
## [7024,] 1.2687760682 0.9659982413 1.447767e+00
## [7025,] -0.5875588994 0.6055022397 -5.262364e-01
## [7026,] -0.8321997062 -0.0037380183 -1.009198e-01
## [7027,] 1.8676339423 -1.5256908652 -2.650463e+00
## [7028,] -0.3982583738 0.7866658993 -5.745006e-01
## [7029,] 1.4699167915 0.9264774711 1.642728e+00
## [7030,] -0.8014408239 -1.1423867609 8.747801e-01
## [7031,] -1.1941062912 0.5615231181 -6.206066e-01
## [7032,] 1.2211564715 1.0725751442 1.355154e+00
```

*# Play with FA utilities*

**fa.parallel**(tablechurnFA) *# See factor recommendation*

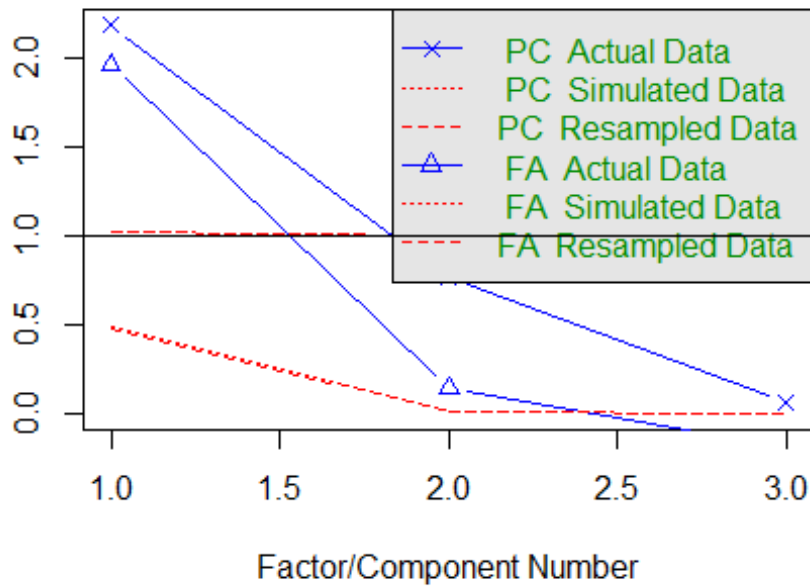
```
## Warning in fac(r = r, nfactors = nfactors, n.obs = n.obs, rotate =
## rotate, : A loading greater than abs(1) was detected. Examine the loadings
## carefully.
```

```
## Warning in fa.stats(r = r, f = f, phi = phi, n.obs = n.obs, np.obs
## = np.obs, : The estimated weights for the factor scores are probably
## incorrect. Try a different factor extraction method.
```

```
## Warning in fac(r = r, nfactors = nfactors, n.obs = n.obs, rotate =
## rotate, : An ultra-Heywood case was detected. Examine the results carefully
```

eigenvalues of principal components and factor analysis

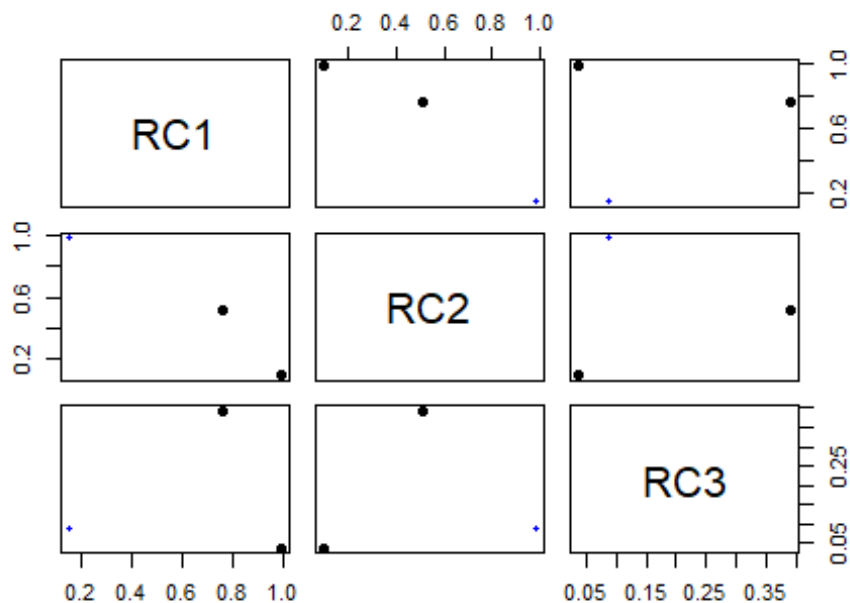
## Parallel Analysis Scree Plots



## Parallel analysis suggests that the number of factors = 2 and the number of components = 1

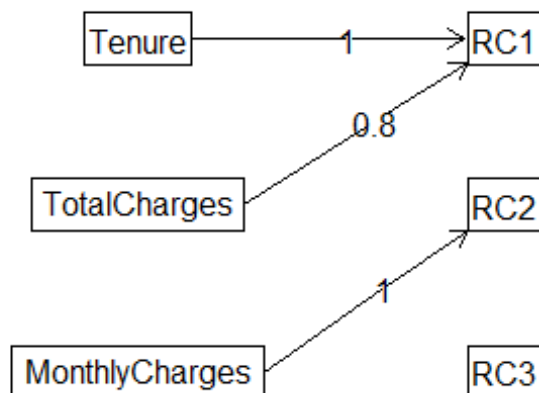
`fa.plot(fit.pc)` # See Correlations within Factors

## Principal Component Analysis

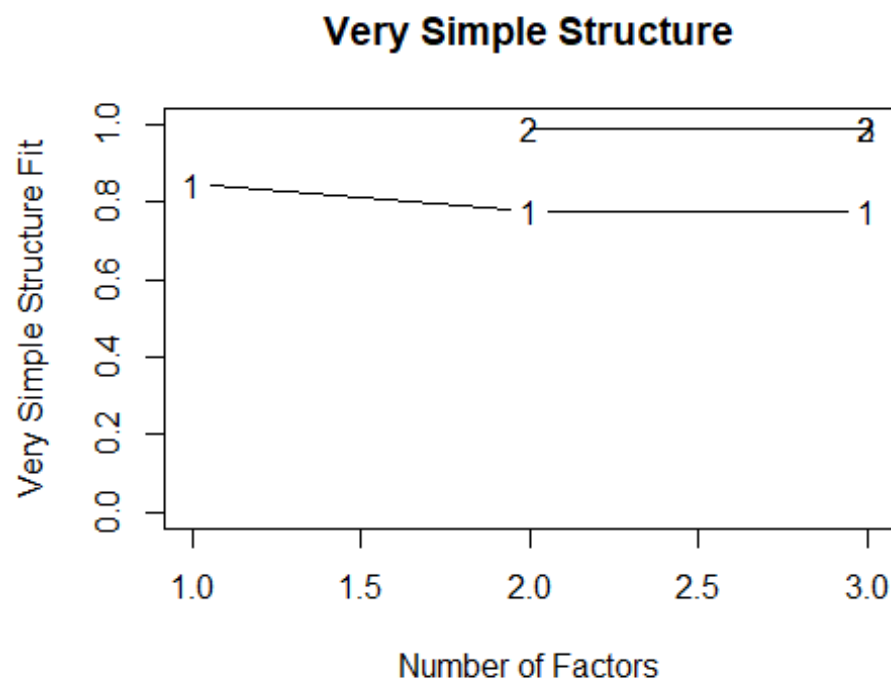


```
fa.diagram(fit.pc) # Visualize the relationship
```

## Components Analysis



```
vss(tablechurnFA) # See Factor recommendations for a simple structure
```



```
##
## Very Simple Structure
## Call: vss(x = tablechurnFA)
## VSS complexity 1 achieves a maximum of 0.85 with 1 factors
## VSS complexity 2 achieves a maximum of 0.99 with 2 factors
##
## The Velicer MAP achieves a minimum of NA with 1 factors
## BIC achieves a minimum of NA with factors
## Sample Size adjusted BIC achieves a minimum of NA with factors
##
## Statistics by number of factors
##   vss1 vss2 map dof   chisq prob sqresid fit RMSEA BIC SABIC complex
## 1 0.85 0.00 0.34  0 4.5e+03  NA   0.816 0.85   NA  NA   NA    1.0
## 2 0.78 0.99 1.00 -2 3.1e-12  NA   0.058 0.99   NA  NA   NA    1.3
## 3 0.78 0.99  NA -3 3.1e-12  NA   0.058 0.99   NA  NA   NA    1.3
##   eChisq  SRMR eCRMS eBIC
## 1 4.6e+02 1.0e-01  NA  NA
## 2 3.0e-14 8.4e-10  NA  NA
## 3 3.0e-14 8.4e-10  NA  NA
```

*##Looking at the output obtained from this step we infer that we just need 2 factors in our case.*

*##i.e. RC1 and RC2 since most of the variance is explained by these factors itself and all the 3 variables in scope of this analysis are explained by RC1 and RC2 factors.*