CovidAnalytics

Surbhi Rathore

4/26/2021

```
## Data being read from JHU/CCSE repository

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## Reading data from https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data

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## A problem was detected when trying to retrieve the data for the package: https://raw.githubusercontent

## The URL or file was not found! Please contact the developer about this!

## simpleWarning in file(file, "rt"): cannot open URL 'https://raw.githubusercontent.com/CSSEGISandData/

## ================================================================================

## We will load the preserved data instead, please notice that this data is not the latest one but inste

## Data being read from *local* repo in the 'covid19.analytics' package

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## Reading data from C:/Users/kgitn/Documents/R/win-library/4.0/covid19.analytics/extdata/latest.RDS

## Data being read from JHU/CCSE repository

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## Reading data from https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data

## Data retrieved on 2021-04-29 00:41:45 || Range of dates on data: 2020-01-22--2021-04-27 | Nbr of rec

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## Data being read from JHU/CCSE repository

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## Reading data from https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data

## Data retrieved on 2021-04-29 00:41:46 || Range of dates on data: 2020-01-22--2021-04-27 | Nbr of rec

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## Data being read from JHU/CCSE repository

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## Reading data from https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data
## Data retrieved on 2021-04-29 00:41:46 || Range of dates on data: 2020-01-22--2021-04-27 | Nbr of rec

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## Data being read from JHU/CCSE repository

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## Reading data from https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data

## Data retrieved on 2021-04-29 00:41:47 || Range of dates on data: 2020-01-22--2021-04-27 | Nbr of rec

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## Data being read from JHU/CCSE repository

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## Reading data from https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data

## Data retrieved on 2021-04-29 00:41:47 || Range of dates on data: 2020-01-22--2021-04-27 | Nbr of rec

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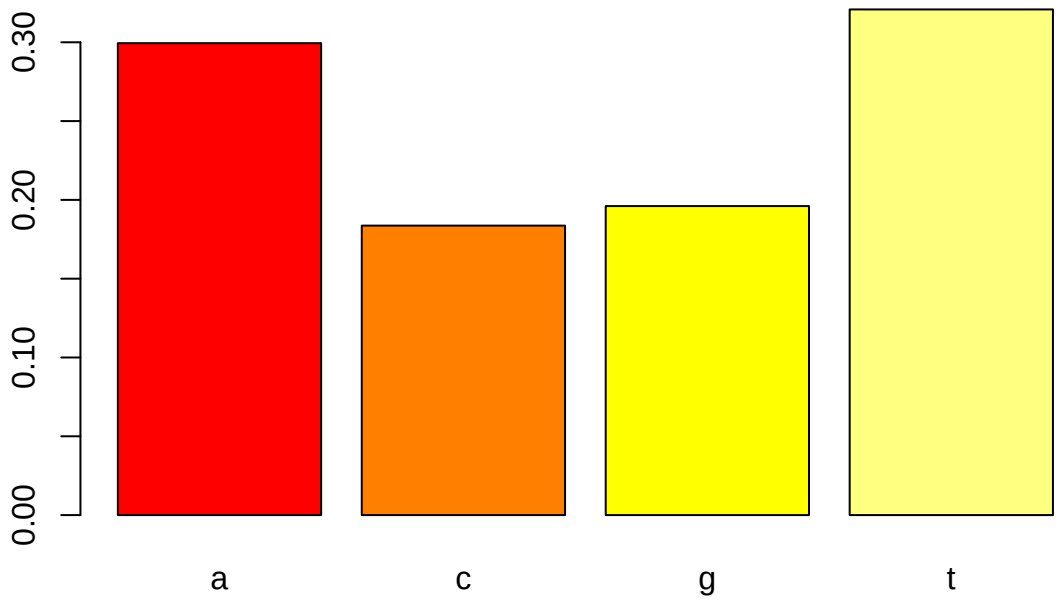
## Loading required package: ape

## Retrieving data from NCBI...

## 29903-none-character
```




```
## Loading required package: plotly

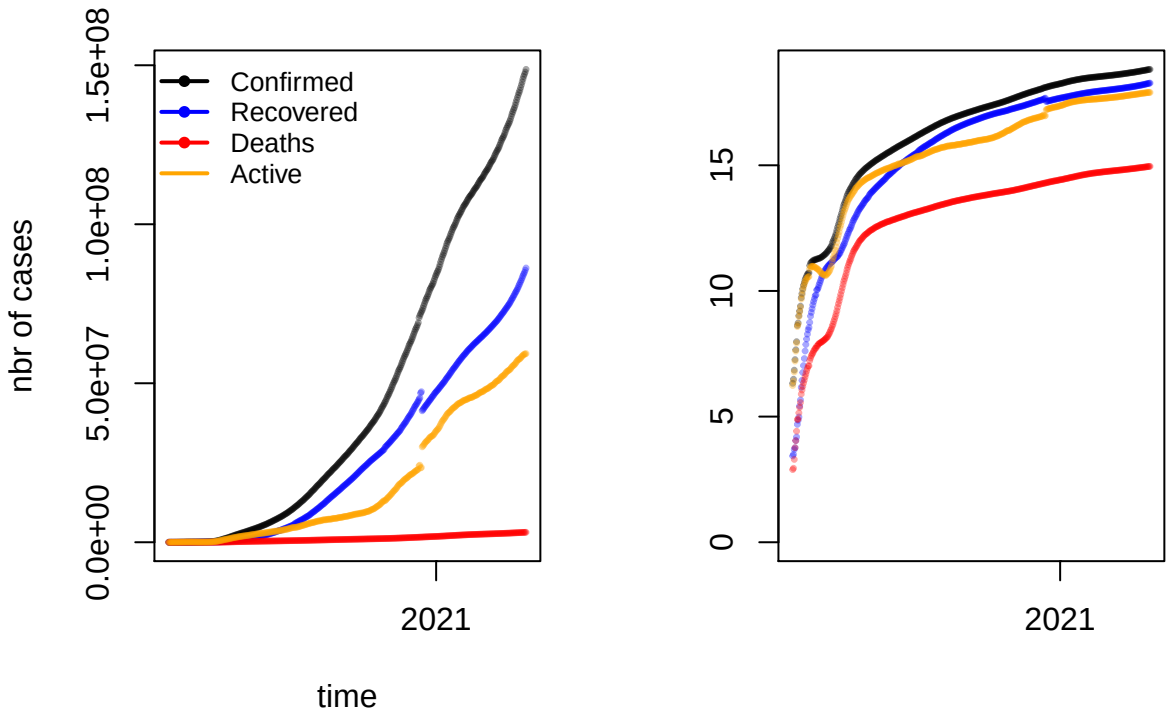
## Loading required package: ggplot2

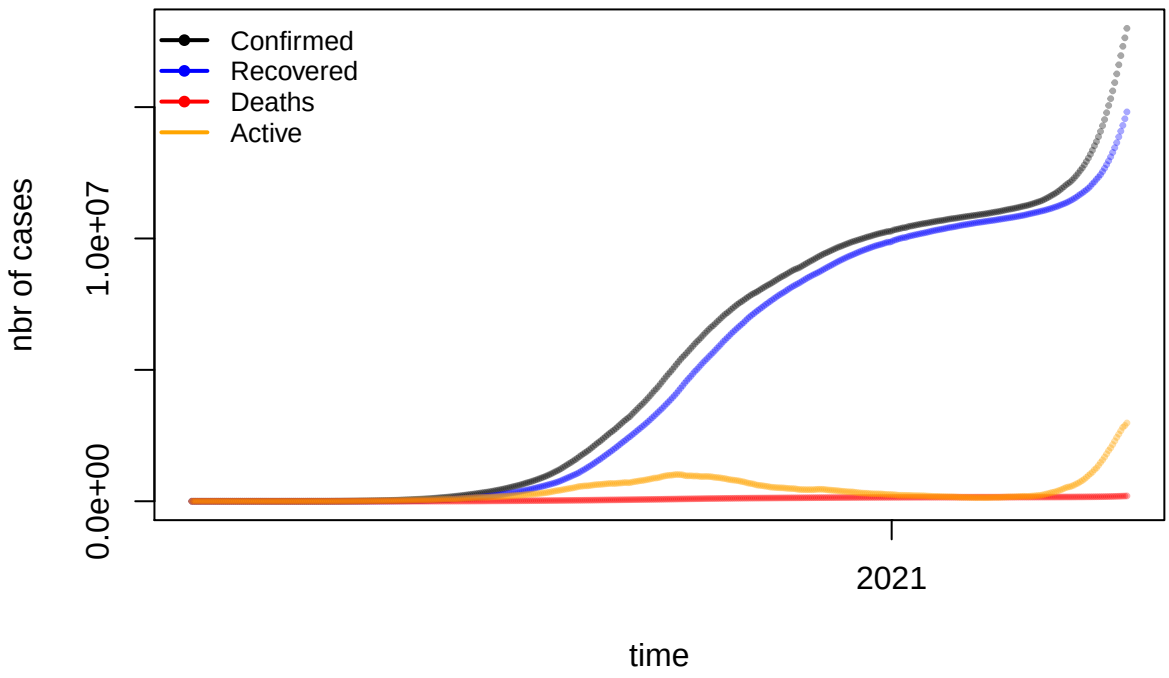
##
## Attaching package: 'plotly'

## The following object is masked from 'package:ggplot2':
##
##     last_plot

## The following object is masked from 'package:stats':
##
##     filter

## The following object is masked from 'package:graphics':
##
##     layout
```


nbr of cases
0.0e+00
5.0e+07
1.0e+08
1.5e+08
Confirmed
Recovered
Deaths
Active
2021
time
0
5
10
15
2021




```
## A line object has been specified, but lines is not in the mode
## Adding lines to the mode...
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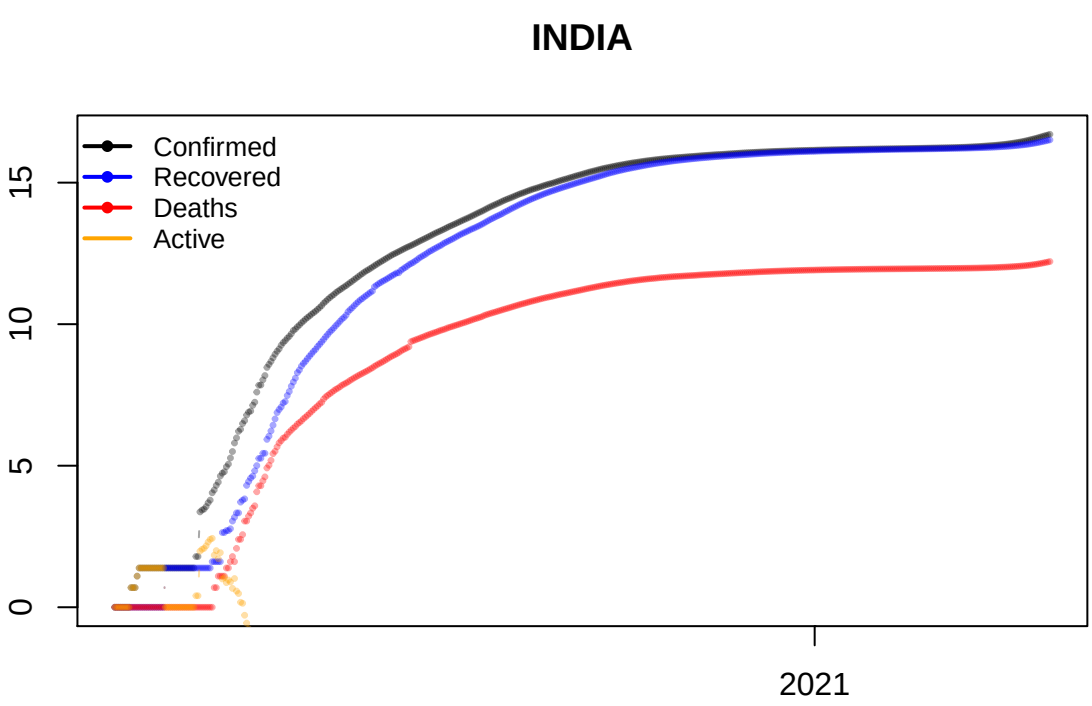
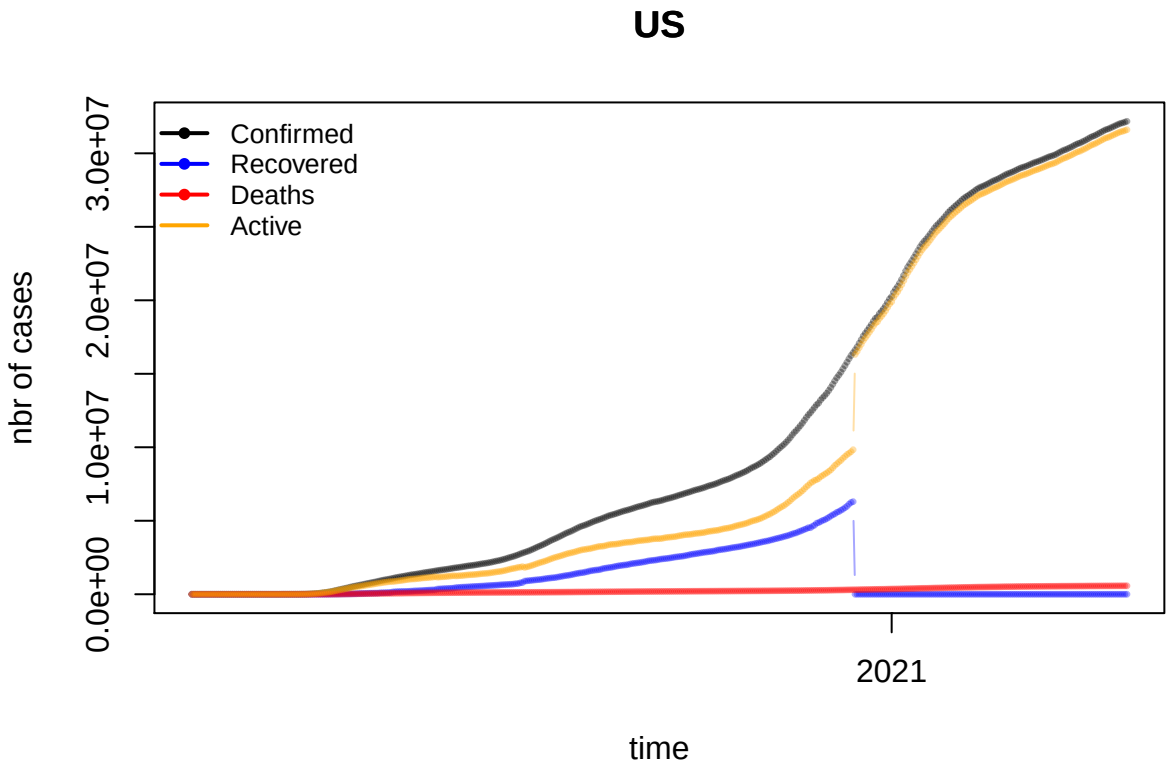

INDIA
Confirmed
Recovered
Deaths
Active
0
5
10
15
2021

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## Adding lines to the mode...
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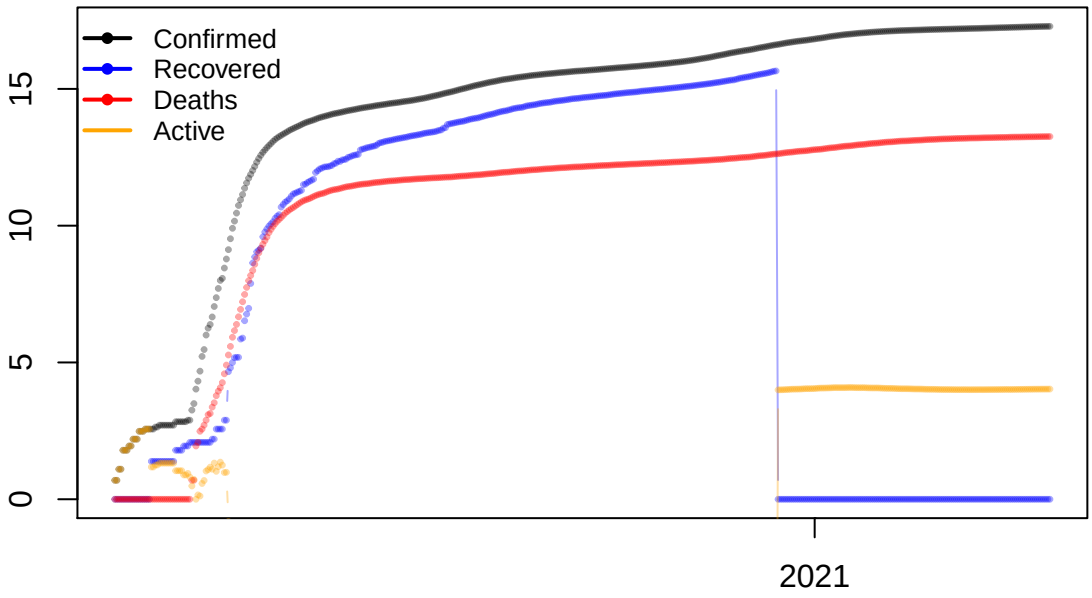


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## A line object has been specified, but lines is not in the mode
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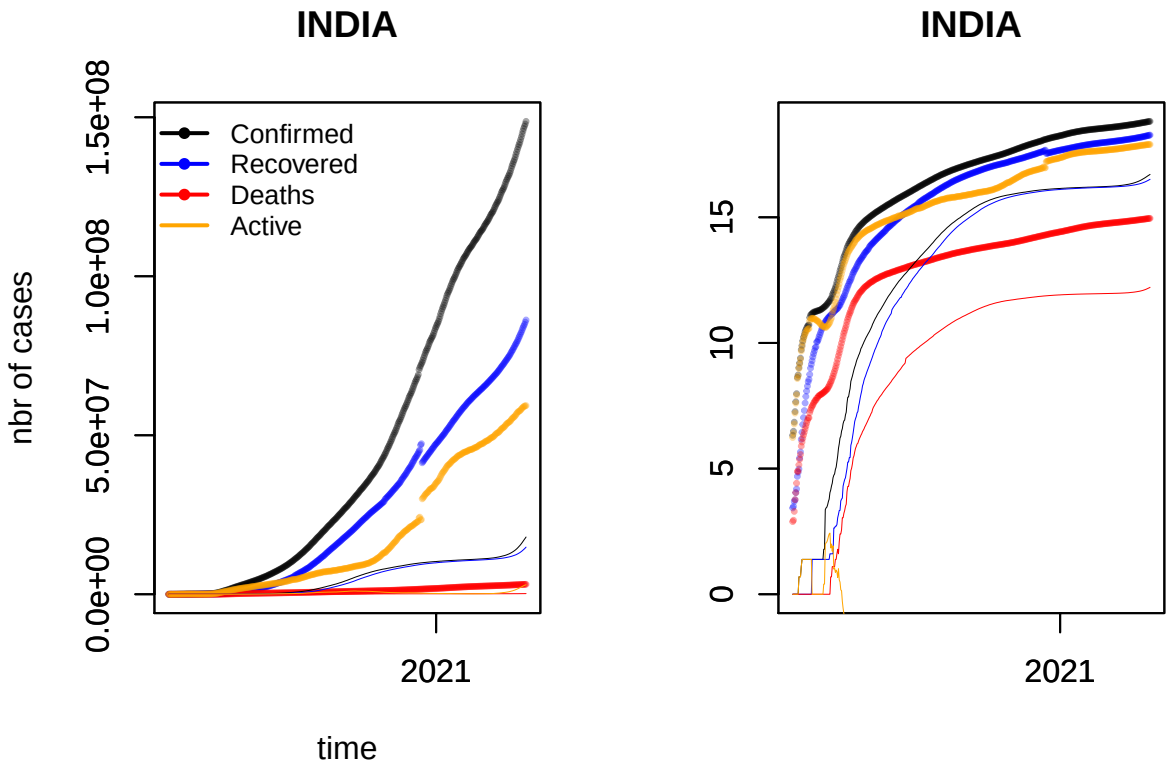


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## A line object has been specified, but lines is not in the mode
## Adding lines to the mode...
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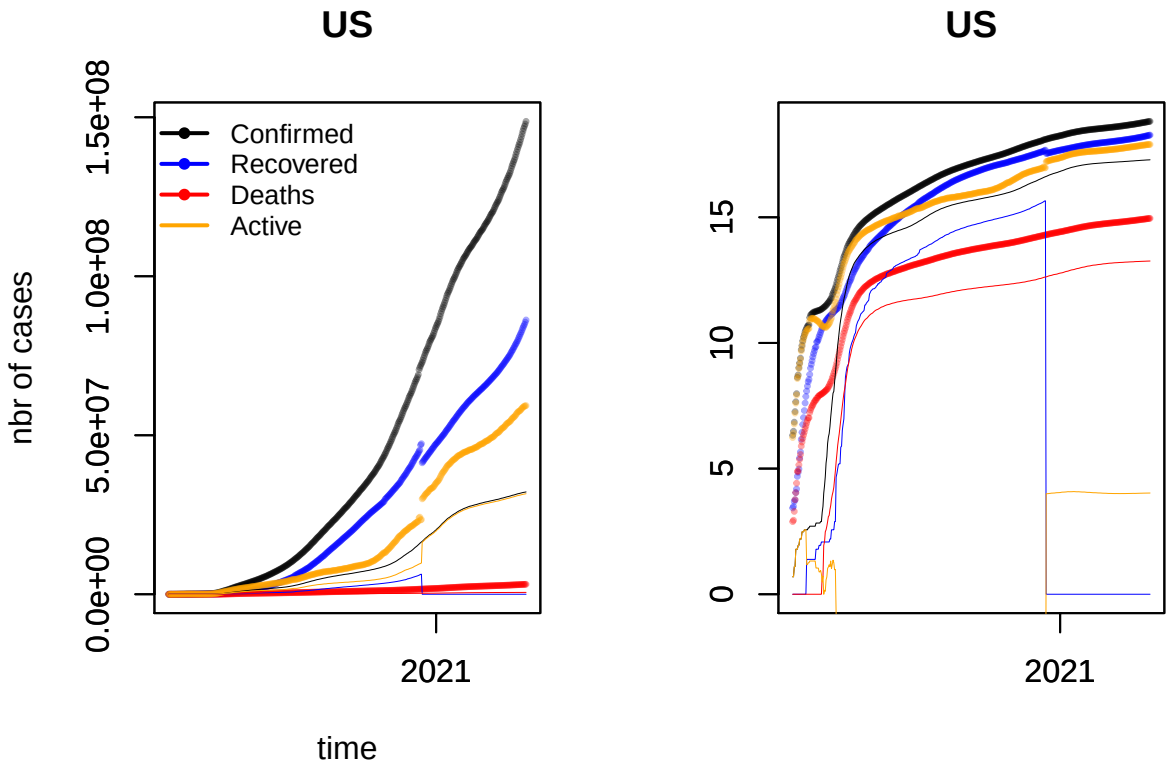

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## Saving interactive plot in totals-all.html

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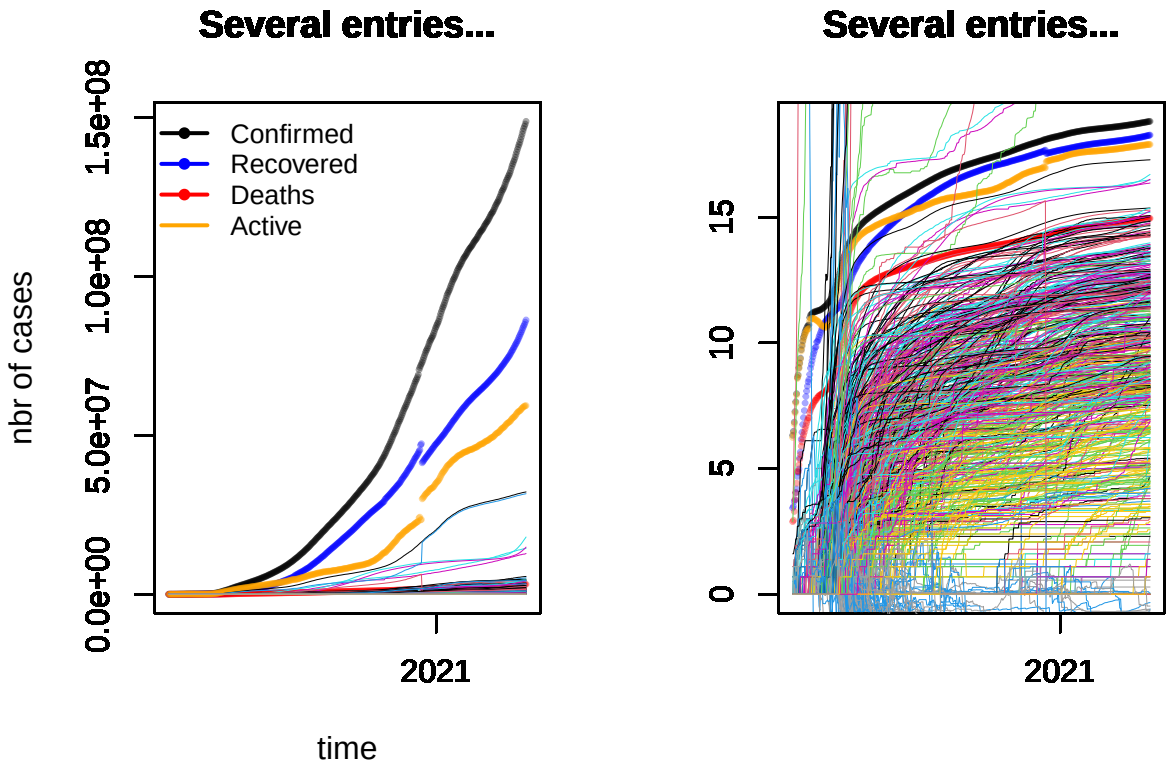


```
## ################################################################################

## This is an experimental feature, being currently under active development!

## Please check the development version of the package for the latest updates on it

## ################################################################################
## Processing...  US
##   [1]       1       1       2       2       5       5       5       6
##   [9]       6       8       8       8      11      11      11      12
##  [17]      12      12      12      12      13      13      14      14
##  [25]      14      14      14      14      14      14      16      16
##  [33]      16      16      16      16      17      17      25      32
##  [41]      55      74     107     184     237     403     519     594
##  [49]     782    1147    1586    2219    2978    3212    4679    6512
##  [57]    9169   13663   20030   26025   34898   46136   56755   68837
##  [65]   86693  105383  125013  143912  165987  192301  224560  256792
##  [73]  289087  321477  351354  382747  413516  444731  480667  515081
##  [81]  544183  571440  598380  627205  652611  682626  715656  743588
##  [89]  769684  799512  825429  854288  887858  920185  950581  977082
##  [97] 1000785 1025362 1051800 1081020 1115946 1143296 1167593 1191678
## [105] 1216209 1240769 1268180 1295019 1320155 1339022 1358293 1381241
## [113] 1401649 1428467 1453214 1477373 1495736 1518126 1539133 1561830
## [121] 1587596 1611253 1632364 1652431 1671104 1690754 1709303 1731625
## [129] 1756098 1779731 1798718 1816154 1837656 1857511 1879150 1904550
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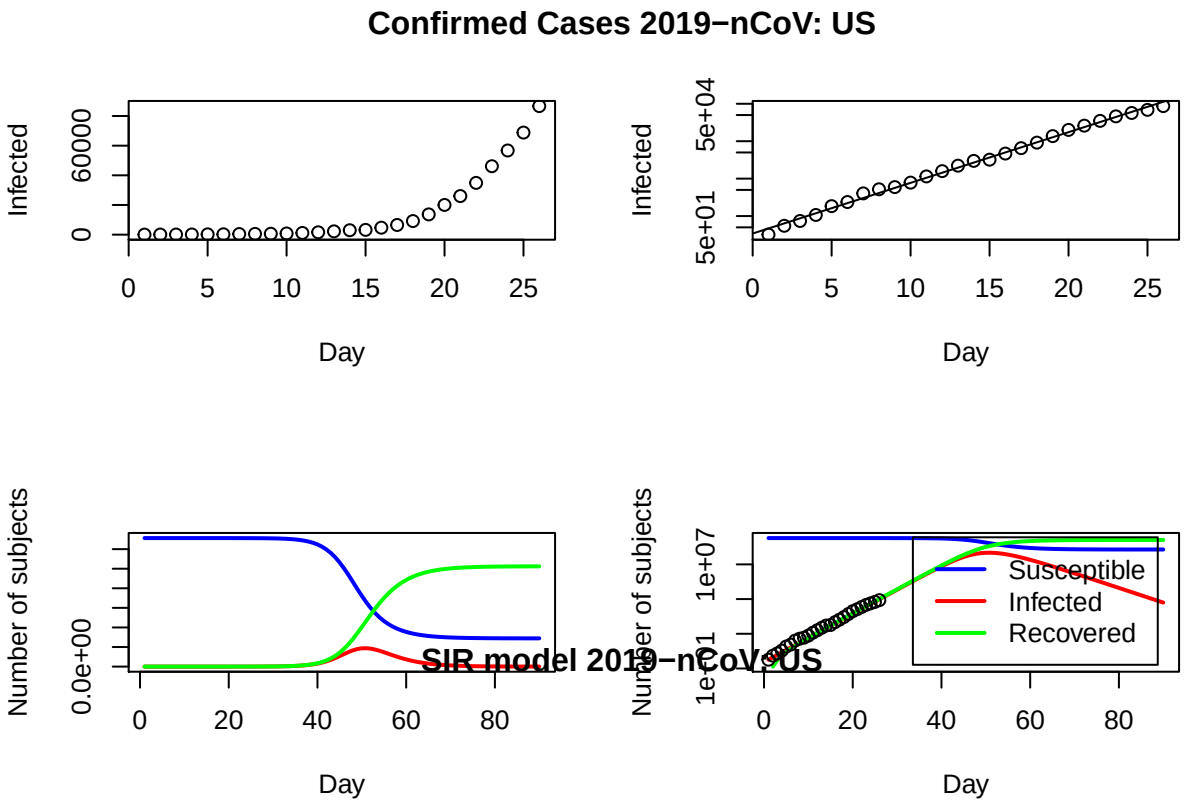
## [137]  1925710  1943626  1961263  1979647  2000757  2023890  2048756  2073964
## [145]  2092912  2112731  2136401  2163465  2191991  2223553  2255823  2280971
## [153]  2313123  2350198  2386074  2426391  2472385  2513731  2554461  2595744
## [161]  2642174  2693993  2750622  2801983  2847664  2898432  2941517  3002171
## [169]  3062290  3124786  3192841  3252874  3311312  3370208  3438244  3506364
## [177]  3582184  3654445  3716980  3777456  3839546  3904066  3974630  4043070
## [185]  4116393  4181308  4236083  4292934  4359391  4431244  4498701  4567420
## [193]  4623604  4669149  4714678  4773479  4827936  4887293  4946590  5000709
## [201]  5046463  5094087  5142088  5198137  5249451  5314791  5361712  5400904
## [209]  5437580  5482614  5529973  5574013  5622842  5665887  5700119  5736641
## [217]  5777001  5822167  5867547  5914395  5957126  5991507  6026895  6068759
## [225]  6109773  6153983  6204376  6247464  6278633  6302200  6329593  6363650
## [233]  6399723  6447501  6488563  6522914  6557342  6596849  6635867  6681004
## [241]  6730288  6772447  6810862  6862834  6902696  6941758  6988869  7037151
## [249]  7081803  7119311  7152546  7195994  7235428  7281081  7336043  7384578
## [257]  7420293  7459742  7504998  7556060  7614653  7671034  7725952  7771893
## [265]  7813735  7865983  7925748  7990636  8059782  8116518  8165858  8233610
## [273]  8295581  8358864  8435164  8517113  8599842  8661982  8729385  8806228
## [281]  8885632  8976684  9075924  9165619  9270467  9355775  9482891  9587499
## [289]  9716853  9844858  9972308 10087380 10207953 10348449 10495075 10659914
## [297] 10840303 11008064 11144288 11307233 11471155 11644332 11835880 12034177
## [305] 12213451 12360235 12534684 12710198 12893485 13005807 13213995 13369528
## [313] 13509762 13670332 13858551 14061108 14284721 14517506 14733048 14914060
## [321] 15108918 15333410 15555949 15787464 16027441 16245026 16432729 16627550
## [329] 16836556 17083256 17322981 17574950 17766856 17954675 18153724 18351735
## [337] 18581353 18775557 18873203 19099491 19255126 19429760 19630012 19863696
## [345] 20099363 20252991 20553301 20762047 20946329 21181440 21436884 21715174
## [353] 22010389 22271084 22484332 22699326 22926246 23156608 23392315 23635046
## [361] 23836726 24014508 24157924 24334630 24517866 24711684 24902437 25073050
## [369] 25204112 25356081 25503621 25657566 25826176 25992744 26135056 26247053
## [377] 26382255 26497588 26619229 26743204 26877601 26981588 27071236 27161551
## [385] 27257183 27352360 27458120 27557758 27644880 27709901 27764087 27826806
## [393] 27896924 27966848 28046145 28117670 28174750 28230970 28303233 28377965
## [401] 28455466 28532812 28597387 28648744 28706973 28764033 28831226 28899277
## [409] 28965728 29023931 29064938 29109974 29167616 29225536 29288010 29349533
## [417] 29402465 29440686 29497352 29551309 29610445 29670983 29732612 29787986
## [425] 29821754 29873347 29926950 30013910 30081375 30158696 30221396 30264493
## [433] 30333922 30395171 30462210 30541255 30611086 30674153 30709125 30786804
## [441] 30847348 30922386 31002264 31084962 31151497 31197877 31268107 31345985
## [449] 31421360 31495649 31575640 31628013 31670031 31737964 31799237 31862094
## [457] 31929351 31991750 32045113 32077178 32124869 32175725
## [1] 40
##  [1]    32    55    74   107   184   237   403   519   594   782  1147  1586
## [13]  2219  2978  3212  4679  6512  9169 13663 20030 26025 34898 46136 56755
## [25] 68837 86693
## ------------------------  Parameters used to create model -----------------------
##      Region: US
##      Time interval to consider: t0=40 - t1= ; tfinal=90
##          t0: 2020-03-02 -- t1:
##      Number of days considered for initial guess: 26
##      Fatality rate: 0.02
##      Population of the region: 328200000
## --------------------------------------------------------------------------------
```

```
## Loading required package: deSolve

## [1] "CONVERGENCE: REL_REDUCTION_OF_F <= FACTR*EPSMCH"
##      beta     gamma
## 0.6601855 0.3398147
##   R0 = 1.94278096379884
##   Max nbr of infected: 47008795.32  ( 14.32 %)
##   Max nbr of casualties, assuming  2% fatality rate: 940175.91
##   Max reached at day : 51 ==>  2020-04-22
## ================================================================================
```




```
## $Infected
##  [1]    32    55    74   107   184   237   403   519   594   782  1147  1586
## [13]  2219  2978  3212  4679  6512  9169 13663 20030 26025 34898 46136 56755
## [25] 68837 86693
##
## $model
##    time         S            I            R
## 1     1 328199968 3.200000e+01 0.000000e+00
## 2     2 328199943 4.408443e+01 1.281786e+01
## 3     3 328199909 6.073240e+01 3.047623e+01
## 4     4 328199862 8.366729e+01 5.480310e+01
## 5     5 328199796 1.152633e+02 8.831672e+01
## 6     6 328199707 1.587910e+02 1.344863e+02
## 7     7 328199583 2.187565e+02 1.980914e+02
```

```
## 8     8 328199413 3.013672e+02 2.857161e+02
## 9     9 328199178 4.151746e+02 4.064312e+02
## 10   10 328198855 5.719595e+02 5.727327e+02
## 11   11 328198410 7.879515e+02 8.018356e+02
## 12   12 328197797 1.085509e+03 1.117456e+03
## 13   13 328196952 1.495431e+03 1.552264e+03
## 14   14 328195789 2.060149e+03 2.151269e+03
## 15   15 328194185 2.838113e+03 2.976475e+03
## 16   16 328191977 3.909840e+03 4.113297e+03
## 17   17 328188934 5.386246e+03 5.679402e+03
## 18   18 328184743 7.420106e+03 7.836880e+03
## 19   19 328178969 1.022186e+04 1.080901e+04
## 20   20 328171015 1.408133e+04 1.490336e+04
## 21   21 328160059 1.939765e+04 2.054356e+04
## 22   22 328144966 2.672042e+04 2.831309e+04
## 23   23 328124178 3.680629e+04 3.901548e+04
## 24   24 328095546 5.069666e+04 5.375722e+04
## 25   25 328056114 6.982439e+04 7.406168e+04
## 26   26 328001814 9.615999e+04 1.020257e+05
## 27   27 327927054 1.324115e+05 1.405343e+05
## 28   28 327824147 1.822972e+05 1.935557e+05
## 29   29 327682540 2.509161e+05 2.665439e+05
## 30   30 327487763 3.452481e+05 3.669888e+05
## 31   31 327220011 4.748250e+05 5.051641e+05
## 32   32 326852241 6.526204e+05 6.951386e+05
## 33   33 326347656 8.962097e+05 9.561339e+05
## 34   34 325656418 1.229251e+06 1.314332e+06
## 35   35 324711459 1.683303e+06 1.805238e+06
## 36   36 323423339 2.299938e+06 2.476723e+06
## 37   37 321674255 3.132947e+06 3.392799e+06
## 38   38 319311726 4.250172e+06 4.638103e+06
## 39   39 316143157 5.734024e+06 6.322819e+06
## 40   40 311933603 7.679066e+06 8.587331e+06
## 41   41 306410575 1.018421e+07 1.160522e+07
## 42   42 299281276 1.333647e+07 1.558226e+07
## 43   43 290267992 1.718391e+07 2.074810e+07
## 44   44 279164700 2.169836e+07 2.733694e+07
## 45   45 265909706 2.673558e+07 3.555472e+07
## 46   46 250655886 3.200954e+07 4.553457e+07
## 47   47 233807861 3.710296e+07 5.728918e+07
## 48   48 215996458 4.152848e+07 7.067506e+07
## 49   49 197983597 4.483101e+07 8.538539e+07
## 50   50 180525770 4.669453e+07 1.009797e+08
## 51   51 164247149 4.700880e+07 1.169441e+08
## 52   52 149564873 4.587184e+07 1.327633e+08
## 53   53 136678453 4.353754e+07 1.479840e+08
## 54   54 125606698 4.033857e+07 1.622547e+08
## 55   55 116244643 3.661529e+07 1.753401e+08
## 56   56 108418547 3.266712e+07 1.871143e+08
## 57   57 101927999 2.872900e+07 1.975430e+08
## 58   58  96573158 2.496723e+07 2.066596e+08
## 59   59  92169761 2.148673e+07 2.145435e+08
## 60   60  88555668 1.834338e+07 2.213010e+08
## 61   61  85592320 1.555695e+07 2.270507e+08
```

```
## 62   62  83163471 1.312267e+07 2.319139e+08
## 63   63  81172729 1.102036e+07 2.360069e+08
## 64   64  79540720 9.221297e+06 2.394380e+08
## 65   65  78202362 7.692989e+06 2.423046e+08
## 66   66  77104401 6.402322e+06 2.446933e+08
## 67   67  76203309 5.317525e+06 2.466792e+08
## 68   68  75463514 4.409275e+06 2.483272e+08
## 69   69  74855937 3.651222e+06 2.496928e+08
## 70   70  74356798 3.020143e+06 2.508231e+08
## 71   71  73946632 2.495863e+06 2.517575e+08
## 72   72  73609503 2.061051e+06 2.525294e+08
## 73   73  73332351 1.700941e+06 2.531667e+08
## 74   74  73104467 1.403039e+06 2.536925e+08
## 75   75  72917066 1.156830e+06 2.541261e+08
## 76   76  72762939 9.534997e+05 2.544836e+08
## 77   77  72636165 7.856865e+05 2.547781e+08
## 78   78  72531881 6.472580e+05 2.550209e+08
## 79   79  72446091 5.331174e+05 2.552208e+08
## 80   80  72375511 4.390360e+05 2.553855e+08
## 81   81  72317442 3.615109e+05 2.555210e+08
## 82   82  72269665 2.976436e+05 2.556327e+08
## 83   83  72230354 2.450383e+05 2.557246e+08
## 84   84  72198007 2.017158e+05 2.558003e+08
## 85   85  72171392 1.660429e+05 2.558626e+08
## 86   86  72149491 1.366720e+05 2.559138e+08
## 87   87  72131469 1.124920e+05 2.559560e+08
## 88   88  72116639 9.258682e+04 2.559908e+08
## 89   89  72104436 7.620176e+04 2.560194e+08
## 90   90  72094394 6.271496e+04 2.560429e+08
##
## $params
## $params$beta
##      beta
## 0.6601855
##
## $params$gamma
##     gamma
## 0.3398147
##
## $params$R0
##       R0
## 1.942781

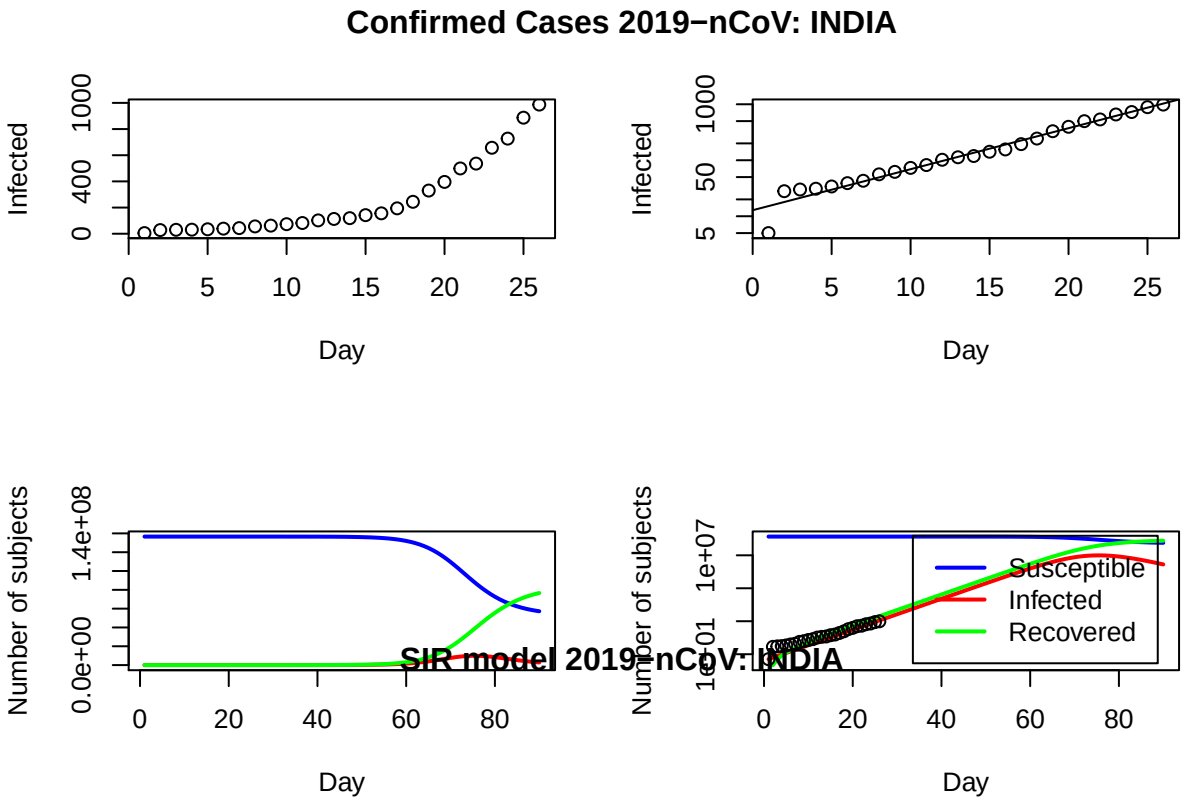
## ############################################################################################

## This is an experimental feature, being currently under active development!
## Please check the development version of the package for the latest updates on it

## ############################################################################################
## Processing...  INDIA
##   [1]        0        0        0        0        0        0        0        0
##   [9]        1        1        1        2        3        3        3        3
##  [17]        3        3        3        3        3        3        3        3
```

```
##  [25]        3        3        3        3        3        3        3        3
##  [33]        3        3        3        3        3        3        3        3
##  [41]        5        5       28       30       31       34       39       43
##  [49]       56       62       73       82      102      113      119      142
##  [57]      156      194      244      330      396      499      536      657
##  [65]      727      887      987     1024     1251     1397     1998     2543
##  [73]     2567     3082     3588     4778     5311     5916     6725     7598
##  [81]     8446     9205    10453    11487    12322    13430    14352    15722
##  [89]    17615    18539    20080    21370    23077    24530    26283    27890
##  [97]    29451    31324    33062    34863    37257    39699    42505    46437
## [105]    49400    52987    56351    59695    62808    67161    70768    74292
## [113]    78055    81997    85784    90648    95698   100328   106475   112028
## [121]   118226   124794   131423   138536   144950   150793   158086   165386
## [129]   173491   181827   190609   198370   207191   216824   226713   236184
## [137]   246622   257486   265928   276146   286605   297535   308993   320922
## [145]   332424   343091   354065   366946   380532   395048   410451   425282
## [153]   440215   456183   473105   490401   508953   528859   548318   566840
## [161]   585481   604641   625544   648315   673165   697413   719664   742417
## [169]   767296   793802   820916   849522   878254   906752   936181   968857
## [177]  1003832  1039084  1077781  1118206  1155338  1193078  1238798  1288108
## [185]  1337024  1385635  1435616  1480073  1531669  1581963  1634746  1695988
## [193]  1750723  1803695  1855745  1908254  1964536  2027074  2088611  2153010
## [201]  2215074  2268675  2329638  2396637  2461190  2525922  2589952  2647663
## [209]  2702681  2767253  2836925  2905825  2975701  3044940  3106348  3167323
## [217]  3224547  3310234  3387500  3463972  3542733  3621245  3691166  3769523
## [225]  3853406  3936747  4023179  4113811  4204613  4280422  4370128  4465863
## [233]  4562414  4659984  4754356  4846427  4930236  5020359  5118253  5214677
## [241]  5308014  5400619  5487580  5562663  5646010  5732518  5818570  5903932
## [249]  5992532  6074702  6145291  6225763  6312584  6394068  6473544  6549373
## [257]  6623815  6685082  6757131  6835655  6906151  6979423  7053806  7120538
## [265]  7175880  7239389  7307097  7370468  7432680  7494551  7550273  7597063
## [273]  7651107  7706946  7761312  7814682  7864811  7909959  7946429  7990322
## [281]  8040203  8088851  8137119  8184082  8229313  8267623  8313876  8364086
## [289]  8411724  8462080  8507754  8553657  8591730  8636011  8683916  8728795
## [297]  8773479  8814579  8845127  8874290  8912907  8958483  9004365  9050597
## [305]  9095806  9139865  9177840  9222216  9266705  9309787  9351109  9392919
## [313]  9431691  9462809  9499413  9534964  9571559  9608211  9644222  9677203
## [321]  9703770  9735850  9767371  9796744  9826775  9857029  9884100  9906165
## [329]  9932547  9956557  9979447 10004599 10031223 10055560 10075116 10099066
## [337] 10123778 10146845 10169118 10187850 10207871 10224303 10244852 10266674
## [345] 10266674 10286709 10323965 10340469 10356844 10374932 10395278 10413417
## [353] 10413417 10450284 10466595 10479179 10495147 10512093 10527683 10542841
## [361] 10557985 10571773 10581823 10595639 10610883 10625428 10639684 10654533
## [369] 10667736 10676838 10689527 10701193 10720048 10733130 10746174 10757610
## [377] 10766245 10777284 10790183 10802591 10814304 10826363 10838194 10847304
## [385] 10858371 10871294 10880603 10892746 10904940 10916589 10925710 10937320
## [393] 10950201 10963394 10977387 10991651 11005850 11016434 11030176 11046914
## [401] 11063491 11079979 11096731 11112241 11124527 11139516 11156923 11173761
## [409] 11192045 11210799 11229398 11244786 11262707 11285561 11308846 11333728
## [417] 11359048 11385339 11409831 11438734 11474605 11514331 11555284 11599130
## [425] 11646081 11686796 11734058 11787534 11846652 11908910 11971624 12039644
## [433] 12095855 12149335 12221665 12303131 12392260 12485509 12589067 12686049
## [441] 12801785 12928574 13060542 13205926 13358805 13527717 13689453 13873825
## [449] 14074564 14291917 14526609 14788003 15061805 15320972 15616130 15930774
```

```
## [457] 16263695 16610481 16960172 17313163 17636186 17997113
## [1] 42
##  [1]   5  28  30  31  34  39  43  56  62  73  82 102 113 119 142 156 194 244 330
## [20] 396 499 536 657 727 887 987
## ------------------------  Parameters used to create model ------------------------
##      Region: INDIA
##      Time interval to consider: t0=42 - t1= ; tfinal=90
##          t0: 2020-03-04 -- t1:
##      Number of days considered for initial guess: 26
##      Fatality rate: 0.02
##      Population of the region: 136600000
## ------------------------------------------------------------------------------
## [1] "ERROR: ABNORMAL_TERMINATION_IN_LNSRCH"
##      beta     gamma
## 0.6081864 0.3918137
##   R0 = 1.55223372087245
##   Max nbr of infected: 9888976.1  ( 7.24 %)
##   Max nbr of casualties, assuming  2% fatality rate: 197779.52
##   Max reached at day : 75 ==>  2020-05-18
## ==============================================================================
```




```
## $Infected
##  [1]   5  28  30  31  34  39  43  56  62  73  82 102 113 119 142 156 194 244 330
## [20] 396 499 536 657 727 887 987
##
## $model
```

```
##    time         S            I            R
## 1     1 136599995 5.000000e+00 0.000000e+00
## 2     2 136599992 6.207825e+00 2.187163e+00
## 3     3 136599987 7.707419e+00 4.902670e+00
## 4     4 136599982 9.569261e+00 8.274145e+00
## 5     5 136599976 1.188086e+01 1.246005e+01
## 6     6 136599968 1.475086e+01 1.765713e+01
## 7     7 136599958 1.831416e+01 2.410966e+01
## 8     8 136599945 2.273821e+01 3.212086e+01
## 9     9 136599930 2.823096e+01 4.206729e+01
## 10   10 136599911 3.505057e+01 5.441645e+01
## 11   11 136599887 4.351754e+01 6.974871e+01
## 12   12 136599857 5.402984e+01 8.878472e+01
## 13   13 136599820 6.708152e+01 1.124191e+02
## 14   14 136599775 8.328601e+01 1.417628e+02
## 15   15 136599718 1.034049e+02 1.781948e+02
## 16   16 136599648 1.283837e+02 2.234275e+02
## 17   17 136599561 1.593965e+02 2.795867e+02
## 18   18 136599453 1.979007e+02 3.493119e+02
## 19   19 136599318 2.457060e+02 4.358801e+02
## 20   20 136599152 3.050590e+02 5.433598e+02
## 21   21 136598944 3.787490e+02 6.768024e+02
## 22   22 136598687 4.702391e+02 8.424792e+02
## 23   23 136598368 5.838287e+02 1.048177e+03
## 24   24 136597972 7.248556e+02 1.303562e+03
## 25   25 136597479 8.999464e+02 1.620636e+03
## 26   26 136596868 1.117328e+03 2.014299e+03
## 27   27 136596110 1.387214e+03 2.503052e+03
## 28   28 136595168 1.722283e+03 3.109859e+03
## 29   29 136593998 2.138276e+03 3.863233e+03
## 30   30 136592547 2.654730e+03 4.798572e+03
## 31   31 136590744 3.295898e+03 5.959816e+03
## 32   32 136588507 4.091884e+03 7.401518e+03
## 33   33 136585729 5.080051e+03 9.191391e+03
## 34   34 136582280 6.306767e+03 1.141349e+04
## 35   35 136577998 7.829572e+03 1.417216e+04
## 36   36 136572683 9.719861e+03 1.759688e+04
## 37   37 136566085 1.206620e+04 2.184838e+04
## 38   38 136557895 1.497845e+04 2.712609e+04
## 39   39 136547730 1.859283e+04 3.367748e+04
## 40   40 136535112 2.307822e+04 4.180954e+04
## 41   41 136519453 2.864387e+04 5.190308e+04
## 42   42 136500021 3.554900e+04 6.443035e+04
## 43   43 136475909 4.411448e+04 7.997679e+04
## 44   44 136445995 5.473723e+04 9.926796e+04
## 45   45 136408889 6.790785e+04 1.232027e+05
## 46   46 136362874 8.423199e+04 1.528937e+05
## 47   47 136305826 1.044564e+05 1.897178e+05
## 48   48 136235123 1.295000e+05 2.353771e+05
## 49   49 136147535 1.604915e+05 2.919733e+05
## 50   50 136039088 1.988133e+05 3.620986e+05
## 51   51 135904902 2.461530e+05 4.489450e+05
## 52   52 135739003 3.045620e+05 5.564346e+05
## 53   53 135534103 3.765210e+05 6.893756e+05
```

```
## 54   54 135281347 4.650095e+05 8.536431e+05
## 55   55 134970035 5.735759e+05 1.056389e+06
## 56   56 134587321 7.064009e+05 1.306278e+06
## 57   57 134117915 8.683413e+05 1.613744e+06
## 58   58 133543806 1.064937e+06 1.991257e+06
## 59   59 132844058 1.302355e+06 2.453587e+06
## 60   60 131994748 1.587236e+06 3.018016e+06
## 61   61 130969128 1.926394e+06 3.704478e+06
## 62   62 129738132 2.326334e+06 4.535534e+06
## 63   63 128271366 2.792517e+06 5.536117e+06
## 64   64 126538696 3.328365e+06 6.732939e+06
## 65   65 124512532 3.934016e+06 8.153452e+06
## 66   66 122170797 4.604913e+06 9.824290e+06
## 67   67 119500418 5.330428e+06 1.176915e+07
## 68   68 116500944 6.092843e+06 1.400621e+07
## 69   69 113187698 6.867058e+06 1.654524e+07
## 70   70 109593709 7.621433e+06 1.938486e+07
## 71   71 105769722 8.319959e+06 2.251032e+07
## 72   72 101781846 8.925684e+06 2.589247e+07
## 73   73  97706941 9.404891e+06 2.948817e+07
## 74   74  93626377 9.731241e+06 3.324238e+07
## 75   75  89619272 9.888976e+06 3.709175e+07
## 76   76  85756390 9.874504e+06 4.096911e+07
## 77   77  82095667 9.696103e+06 4.480823e+07
## 78   78  78679830 9.371990e+06 4.854818e+07
## 79   79  75536055 8.927323e+06 5.213662e+07
## 80   80  72677257 8.390855e+06 5.553189e+07
## 81   81  70104384 7.791847e+06 5.870377e+07
## 82   82  67809145 7.157642e+06 6.163321e+07
## 83   83  65776714 6.512060e+06 6.431123e+07
## 84   84  63988117 5.874568e+06 6.673732e+07
## 85   85  62422181 5.260097e+06 6.891772e+07
## 86   86  61057010 4.679305e+06 7.086368e+07
## 87   87  59871034 4.139100e+06 7.258987e+07
## 88   88  58843704 3.643291e+06 7.411300e+07
## 89   89  57955914 3.193252e+06 7.545083e+07
## 90   90  57190213 2.788538e+06 7.662125e+07
##
## $params
## $params$beta
##      beta
## 0.6081864
##
## $params$gamma
##     gamma
## 0.3918137
##
## $params$R0
##       R0
## 1.552234
```

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.