

# Forecasting of coronavirus COVID19 epidemic (SIR model)

It is assumed that the model is a reasonable description of the one-stage epidemic. In particular, the model assumes a constant population, uniform mixing of the people, and equally likely recovery of infected. The model is data-driven, so its forecast is as good as data are. The forecasting change with new or changed data.

**DISCLAIMER:** The model may fail in some situations. In particular, the model may be unadequate, the model may fail in the initial phase and in when additional epidemic stages or outbreaks (not described by SIR model) are encountered. Use it at your own discretion.

## Source of data

<https://www.worldometers.info/coronavirus/coronavirus-cases/#case-tot-outchina>

[https://en.wikipedia.org/wiki/2019%E2%80%932020\\_coronavirus\\_pandemic\\_by\\_country\\_and\\_territory](https://en.wikipedia.org/wiki/2019%E2%80%932020_coronavirus_pandemic_by_country_and_territory)

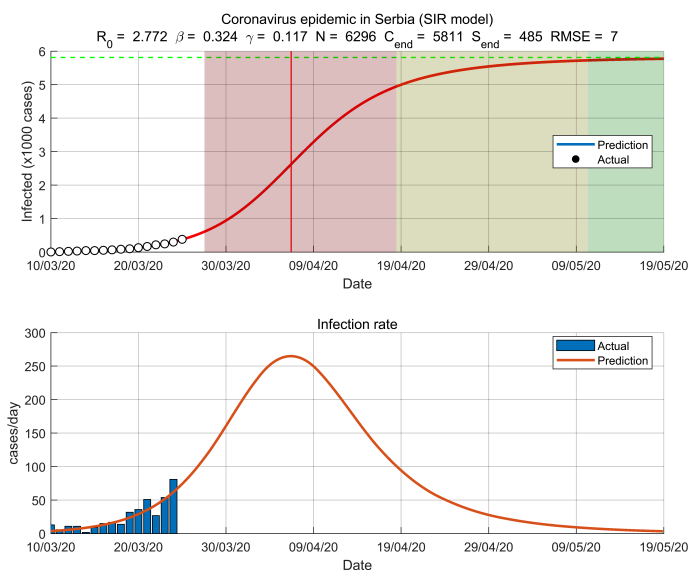
An actual source of data is for each country reported in the corresponding `getData` function.

## Report

```
fprintf('Date: %s\n',datestr(date))
```

Date: 25-Mar-2020

```
aut = fitVirusCV19(@getDataSerbia,'prn','on','nmax',1e5);
```



Epidemic modeling by susceptible-infected-recovered (SIR) model

Country	Serbia
Day	17
Estimated the SIR model parameters	
Contact rate (beta)	0.324 (1/day)
Removal rate (gamma)	0.117 (1/day)
Population size (N)	6296
Initial number of cases (I0)	9
Basic reproduction number (R0)	2.772
Final state	
Final number of cases	5811
Final number of susceptibles	484
Daily forecast for 26-Mar-2020	
Total	459
Increase	75
Estimated logistic model parameters	
Epidemic size (K)	4912 (cases)
Epidemic rate (r)	0.207196 (1/day)
Initial doubling time	3.3 (day)
Estimated duration (days)	
Turning day	28
Acceleration phase	10 (days)
Deacceleration phase	12 (days)
Total duration	22 (days)
Estimated datums	
Outbreak	09-Mar-2020
Start of acceleration	28-Mar-2020
Turning point	06-Apr-2020
Start of steady growth	18-Apr-2020
Start of ending phase	10-May-2020
Statistics	
Number of observations	17
Degrees of freedom	13
Root Mean Squared Error	7.12415
R-Squared	0.997
Adjusted R-Squared	0.996
F-statistics vs. zero model	1337.74
p-value	1.95406e-16
Method	
Total cases weight	1
Infection rate weight	0
Objective function value	25.6864
Exit condition (1=OK)	0