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%9320_coronavirus_pandemic_by_country_and_territory

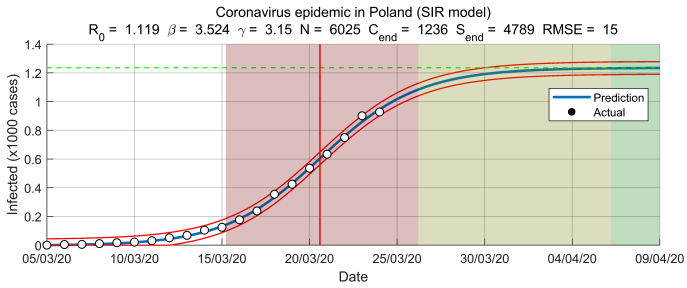
An actual source of data is for each country reported in the corresponding getData function.

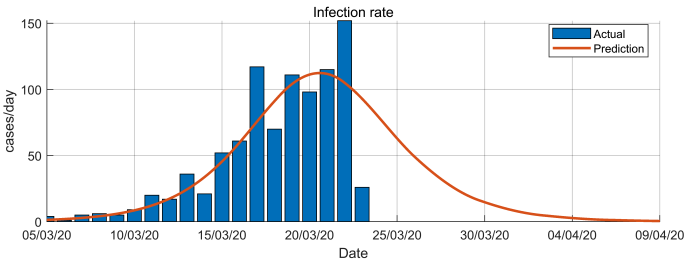
Report

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

```
Date: 25-Mar-2020
```

```
aut = fitVirusCV19(@getDataPoland,'prn','on');
```





```
Epidemic modeling by susceptible-infected-recovered (SIR) model
  Country                        Poland
  Day                            20
Estimated the SIR model parameters
  Contact rate (beta)            3.524 (1/day)
  Removal rate (gamma)           3.15 (1/day)
  Population size (N)            6024
  Initial number of cases (I0)   0
Basic reproduction number (R0)   1.119
Final state
  Final number of cases          1235
  Final number of susceptibles   4789
Daily forcast for 25-Mar-2020
  Total                          1017
  Increase                       71
Estimated logistic model parameters
  Epidemic size (K)              1156 (cases)
  Epidemic rate (r)              0.374276 (1/day)
  Initial doubling time          1.9 (day)
Estimated duration (days)
  Turning day                    16
  Acceleration   phase           5 (days)
  Deaceleration  phsee           6 (days)
  Total duration                 11 (days)
Estimated datums
  Outbreak                       05-Mar-2020
  Start of acceleration          15-Mar-2020
  Turning point                  21-Mar-2020
  Start of steady growth         26-Mar-2020
  Start of ending phase          06-Apr-2020
Statistics
  Number of observations         20
  Degrees of freedom             16
  Root Mean Squared Error        14.6727
  R-Squared                      0.998
  Adjusted R-Squared             0.998
  F-statistics vs. zero model    2958.07
  p-value                        3.67167e-22
Method
  Total cases weight             0.5
  Infection rate weight          0.5
  Objective function value       76.7662
  Exit condition (1=OK)          0
```