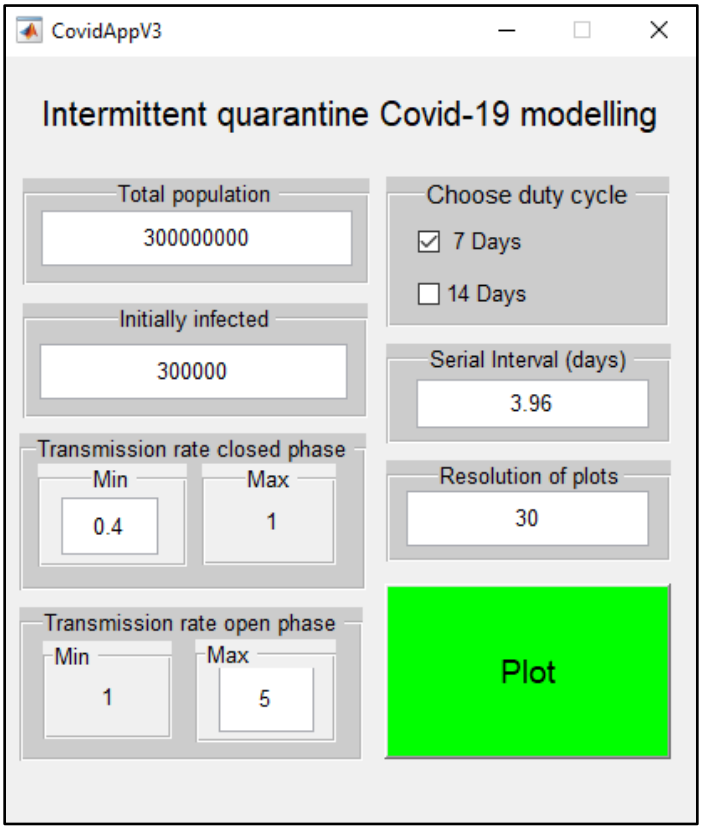
Manual for intermittent quarantine plotting tool

To install download the newest version from https://github.com/jeppehave/COVID19 and follow instructions on the screen. This stand-alone application have been tested on Windows 7 and 10.

This tool produces a series of plots illustrating maximum number of newly infected per day during a 300 day period when intermittent quarantine is being implemented. The heat map plots produced illustrates a specific lockdown strategy (e.g. 2 day open phase and a 5 day closed/lockdown phase). Imposed onto the heat map is a red line illustrating the border between negative- (left of the red line) and positive (right of the red line) trend of newly infected. If a 7 day duty cycle is chosen 6 heat maps is produced for specific open/closed strategies, if 14 day duty cycle is chosen 10 heat maps are produced.

Furthermore, two summarizing plots are produced comparing the different lockdown strategies for both 7- and 14 day duty cycle.



The above mentioned plots can be produced after altering the following starting parameters in the model:

- **Total population**
  Total number of people in region of interest. This parameter will influence the transmission rates as only the number of uninfected individuals can be newly infected.

- **Initially infected**
  This is the number of people infected at time zero and thereby are able to infect other people individuals. If this number is more than 1% of the total population it will be necessary to increase the transmission rate ranges to see the border between safe- and unsafe parameter space
- **Transmission rate range for the closed phase of the duty cycle**
  By entering a minimum reproductive rate of interest for the closed or lockdown phase of the duty cycle the model will predict the effects of reproductive rates within the given window on the number of newly infected against a range of reproductive rates during the open phase. This number must be below one, as this application simulates an intermittent lockdown. Any reproductive rates above one combined with a higher than one reproductive rates during the open phase will inevitably lead to a positive growth of newly infected.
- **Transmission rate for the open phase of the duty cycle**
  Similar to the above parameter, one can enter a maximum reproductive rates but for the open phase of a duty cycle and test the effects on the number of newly infected against the range of reproductive rates during the closed phase. This number must be above one as reproductive rate below one combined with intermittent lockdown with even reproductive rate will lead to negative growth of newly infected.
- **Duty cycle**
  Duty cycle corresponds to the total duration of the cycle consisting of a closed phase and an open phase. For ease of administrative purposes we have included one and two weeks in this application. A pre-Covid situation could best be described with the one week cycle and two day lockdown option. This situation post-covid-19 would demand very low reproductive rates in order to lead to negative growth of newly infected.
- **Serial Interval (days)**
  Serial interval is the average time from being infected to infecting another subject. Changing this number will not change the red lines in the heat maps and thereby the summarizing plot for safe- and unsafe open/closed strategies. The maximum number of newly infected during 300 days and hence the heat maps will be influenced though.
- **Resolution of plots**
  This parameter describes how many steps there will be in the modeling for both reproductive rates. If resolution is set to 30, then the application will model a 300 day scenario for 30 equally spaced closed phase reproductive rates and for each of the 30 equally spaced open phase reproductive rates. Depending on whether a 7- or 14 day duty cycle is chosen the application will model 6-10 different lockdown scenarios. As an example we can choose a resolution of 30 and duty cycle of 14 days. Choosing a 14 day duty cycle includes calculating 10 different strategies, as a result, this setup will lead to a 300 day model run for 30*30*10=9000 different scenarios. Number of scenarios being modelled will be shown in popup window while models is being run. Increasing the resolution will lead to smoother plots, however calculation cost will also increase with the square of resolution setting.

After pressing the “Plot” button all relevant plots will be produced in separate figures. Each figure can be copied direct into other documents using the “copy figure” options in the edit menu. Figures can furthermore be saved in a waste array of commonly used vector graphics- and bitmap formats using the “save as” option in the file menu.