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```
Tdata = load('mockdata_v2.mat');
```

NOTE:

The way we plot is by selecting parsed data 1 by 1 and just hitting run. This helps us adjust the parameters between different sets of data for testing purposes. We can also use this to isolate different segments and plot individually. This design choice for code was purposeful

```
Data1.cumulativeDeaths = Tdata.cumulativeDeaths(1:100);  
Data1.InfectedProportion = Tdata.InfectedProportion(1:100);  
Data2.cumulativeDeaths = Tdata.cumulativeDeaths(101:end);  
Data2.InfectedProportion = Tdata.InfectedProportion(101:end);
```

```
InputData = Data1;  
Inputtime = length(Data1.InfectedProportion);
```

```
sirafun= @(x)siroutput2(x,Inputtime,InputData);
```

set up rate and initial condition constraints

Set A and b to impose a parameter inequality constraint of the form $A*x < b$ Note that this is imposed element-wise If you don't want such a constraint, keep these matrices empty.

```
A = [1 1 1 1 1 0 0 0 0 0 0];  
b = 1;
```

set up some fixed constraints

Set Af and bf to impose a parameter constraint of the form $Af*x = bf$ Hint: For example, the sum of the initial conditions should be constrained If you don't want such a constraint, keep these matrices empty.

```
Af = ([0,0,0,0,0,1,1,1,1,1,1]);  
bf = 1;
```

set up upper and lower bound constraints

Set upper and lower bounds on the parameters $lb < x < ub$ here, the inequality is imposed element-wise If you don't want such a constraint, keep these matrices empty.

```

% ub = [0.1 0.1 0.1 0.017955 0.1 1      1 1 1 0 0]; % Constraints for after
100 days
% lb = [0 0 0 0 0 0 0 0 0 0      0];

ub = [0.01 1 1 0 1 1 1      1 1 0 0]; % Constraints till 100 days
lb = [0 0 0 0 0 1 0 0 0 0      0];

% Specify some initial parameters for the optimizer to start from
x0 = [0.0001 0 0.0010 0.00 0 1 0.01 0.1 0 0 0];

x = fmincon(sirafun,x0,A,b,Af,bf,lb,ub);
Y_fit = siroutput_full2(x,Inputtime);
simInf = Y_fit(:,2) + Y_fit(:,6);
simDeaths = Y_fit(:,4);
hold on
% plot(Tdata.InfectedProportion);
% % plot(simInf)
% %plot(transpose(101:365),simInf);
% title('Simulation and data: Infected Proportion')
% xlabel('Days')
% ylabel('Infected Proportion')

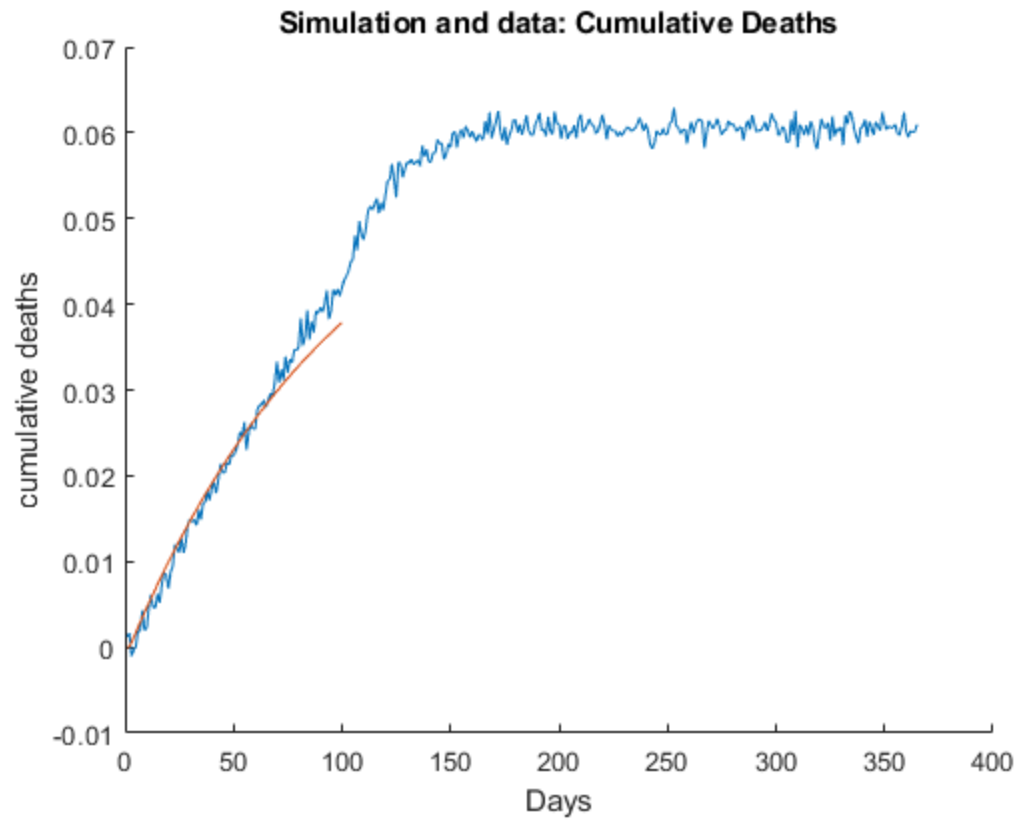
plot(Tdata.cumulativeDeaths)

plot(simDeaths)
% plot(transpose(101:365),simDeaths);
title('Simulation and data: Cumulative Deaths')
xlabel('Days')
ylabel('cumulative deaths')

```

Local minimum possible. Constraints satisfied.

fmincon stopped because the size of the current step is less than the value of the step size tolerance and constraints are satisfied to within the value of the constraint tolerance.



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