Table of Contents

Outbreak

We have been asked to calculate the spread of disease XX living the islands Ping and Pong. XX is a contagious and fatal disease. if a one or more infected person is on the island then 20% of the healthy population are infected each day. XX also is fatal for 10% of sufferes per day.

```
%close all open plots
close all
```

Request SOLVER, SCENARIO and number of STEPS from user

```
SOLVER =  input('Please select the solution method 1) FE, 2) BE, 3)
 ME:   ');
SCENARIO = input('Please select (1,2,3 or 4): ');
STEPS = input('please enter the number of steps: ');
```

```
Error using input
Cannot call INPUT from EVALC.

Error in main_tut (line 13)
SOLVER =  input('Please select the solution method 1) FE, 2) BE, 3)
 ME:   ');
```

Initialise array of function handles for the three methods (FE, BE, ME)

```
integrators = {@FE_tut, @BE_tut, @ME_tut};
```

Initial conditions here (total population, infected, dead...)

```
%Initial population
pop_pin = 1000;
pop_pon = 1000;
```

```
inf_pin = 10;
inf_pon = 0;

dead_pin = 0;
dead_pon = 0;

y0 = [pop_pin;
    inf_pin;
    dead_pin;
    pop_pon;
    inf_pon;
    dead_pon;];
```

Start and End times of simulation

```
t0 = 0;
Tend = 100;

tic
```

Select scenario to solve

```
switch SCENARIO
    case 1
        % %Solve 2ns Scenario
        [y, t] = integrators{SOLVER}(@scenario1,Tend,STEPS,y0,t0);
    case 2
        % %Solve 2ns Scenario
        [y, t] = integrators{SOLVER}(@scenario2,Tend,STEPS,y0,t0);
    case 3
         %Solve 3rd Scenario
        [y, t] = integrators{SOLVER}(@scenario3,Tend,STEPS,y0,t0);
end
timer = toc;
```

Plot results

```
plot(t,y)

%label plot
xlabel('time (days)');
ylabel('Number of people');

%create legend
legend('Healthy Ping','Infected Ping','Dead Ping','Healthy
 Pong','Infected Pong','Dead Pong')
fprintf('%d\n', timer)
```

Published with MATLAB® R2016b