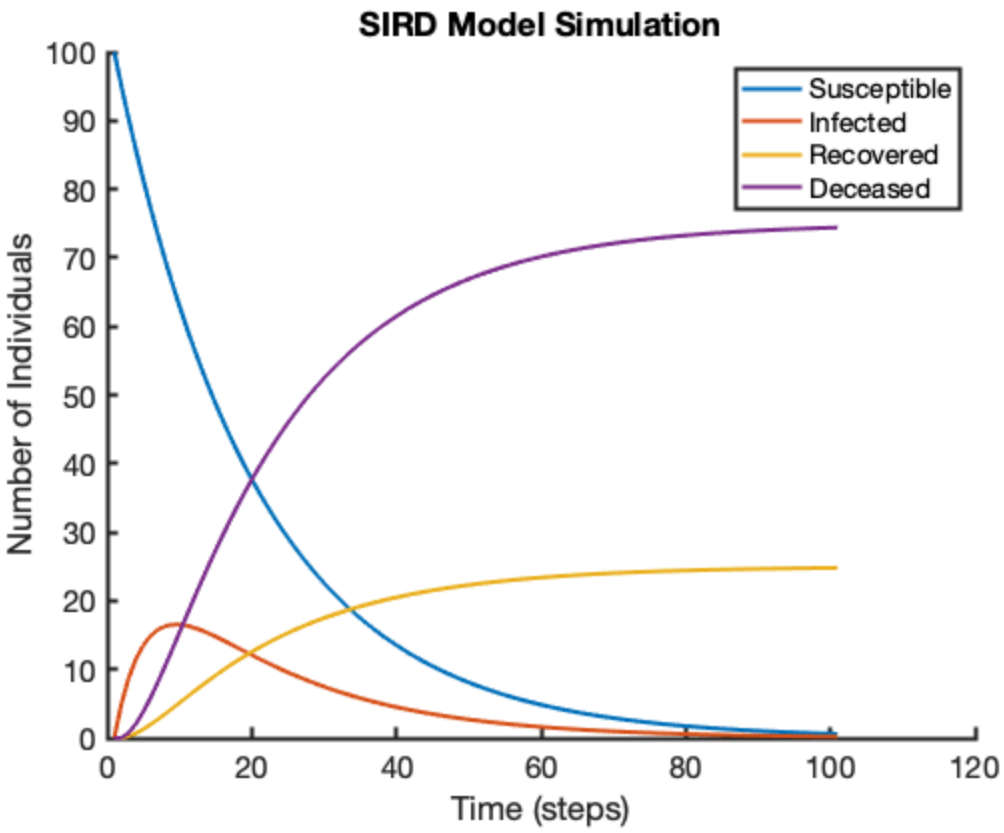
Table of Contents

Creates vectors for S, I, R, and D that represent a time series.

```
t = 100; % Number of time steps

x = [100; 0; 0; 0]; % Initial conditions

A = [ 0.95, 0.0, 0, 0; % Infection, death, recovery rates, etc.
      0.05, 0.8, 0, 0;
         0, 0.05, 1, 0;
         0, 0.15, 0, 1];

[S, I, R, D] = sird(x, A, t);
```

Plots the epidemic.

```
figure;
hold on
set(gca, "linewidth", 2);
plot(S, "linewidth", 2);
plot(I, "linewidth", 2);
plot(R, "linewidth", 2);
plot(D, "linewidth", 2);
set(gca, "fontsize", 15);
legend("Susceptible", "Infected", "Recovered", "Deceased");
title("SIRD Model Simulation");
ylabel("Number of Individuals");
xlabel("Time (steps)");

ax = gca;
exportgraphics(ax, "model.eps", "Resolution", 300);
```



Models and epidemic given an initial condition and rates of death, infection,

recovery, etc.

```
function [S, I, R, D] = sird(x, A, t)
S = zeros(1, t+1);
I = zeros(1, t+1);
R = zeros(1, t+1);
D = zeros(1, t+1);
S(1) = x(1);
I(1) = x(2);
R(1) = x(3);
D(1) = x(4);
for i = 1:t
    x = A * x;
    S(i+1) = x(1);
    I(i+1) = x(2);
    R(i+1) = x(3);
    D(i+1) = x(4);
end

end
```

Published with MATLAB® R2020a