
```

% ##### 5 #####
% #1 - ##### - #####, ##### #1, #2, #3
% #2 - ##### - #####, ##### #1
% #####
% #1 - ##### - ##### m - ##### #2 #####
% #2 - ##### - ##### k - ##### #1 #####
% #3 - ##### - ##### - ##### #2 #####
% #####
% ##### #3 #####
%
% #####:
% >> M1(n) = m*#1(n - 1) + k1*#2(n - 1) + #3(n - 1)
% >> #2(n) = M1(n - 1) **
% >> #1(n) = M2(n - 1) **
% >> #2(n) = #1(n - 1) **
% >> #3(n) = #3(n - 1) + #2(n - 1) **
%
% ##### ** # #####
% (n-1)-#
% ##### n-# :
% Sum(n) = Sum(n - 1) + D, # D = m*#1(n - 1) + k1*#2(n - 1) + #3(n - 1)
%
% ##### #
kr = [1; 0; 0; 0; 0];
% #####, #####
% #####.
%
% #####, #####
% #####
L = diag(0) + diag(1./[1;1;1;1], -1);
% #####
% #####
m = 20;
% #####
% #####
k = 2;
% #####
% #####
L(1, 3) = m;
L(1,4) = k;
L(1,5) = 1;
% # #####, #####
% #####
L(end,end) = 1;

disp("Leslie Matrix")
display(L)

% ##### 5 #####

```

```

N = 5;
p = zeros(5, N + 1);
p(:, 1) = kr;
for kr = 1 : N
    p(:, kr+1) = L* p(:, kr);
end
disp("Results from 0 to 5 month")
disp(p)

% #####
% ### - #####
[V, D] = eig(L);
cz = eig(L);
disp("#####");
disp("### - #####");
% #####
disp(cz)
disp("#####");
disp(V)

% 2.7560 - #####
% ### #####:
vec = (V(:,3));
disp("#####");
disp(vec)
% ##### L*vec = lambda.*vec
%disp(L*vec == cz(3).*vec)
%
% #####
p_size = sum(p);
figure(1);
plot(0:N, p_size, '-', 'LineWidth', 2); % #####
grid on;

hold on;
plot(0:N, p, '-.'); % ##### "M1", "M2", "#1", "#2", "#3"
hold off;

xlabel('n, year');
legend('Population size', 'M1', 'M2', '#1', '#2', '#3' );
title('Poupulation evolution over time', 'according to Leslie model');

```

Leslie Matrix

$L =$

0	0	20	2	1
1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	1

Results from 0 to 5 month

1	0	0	20	2	1
---	---	---	----	---	---

0	1	0	0	20	2
0	0	1	0	0	20
0	0	0	1	0	0
0	0	0	0	1	1

```
#####
### - #####
-1.3270 + 2.3477i
-1.3270 - 2.3477i
 2.7560 + 0.0000i
-0.0525 + 0.0000i
 0.9505 + 0.0000i
```

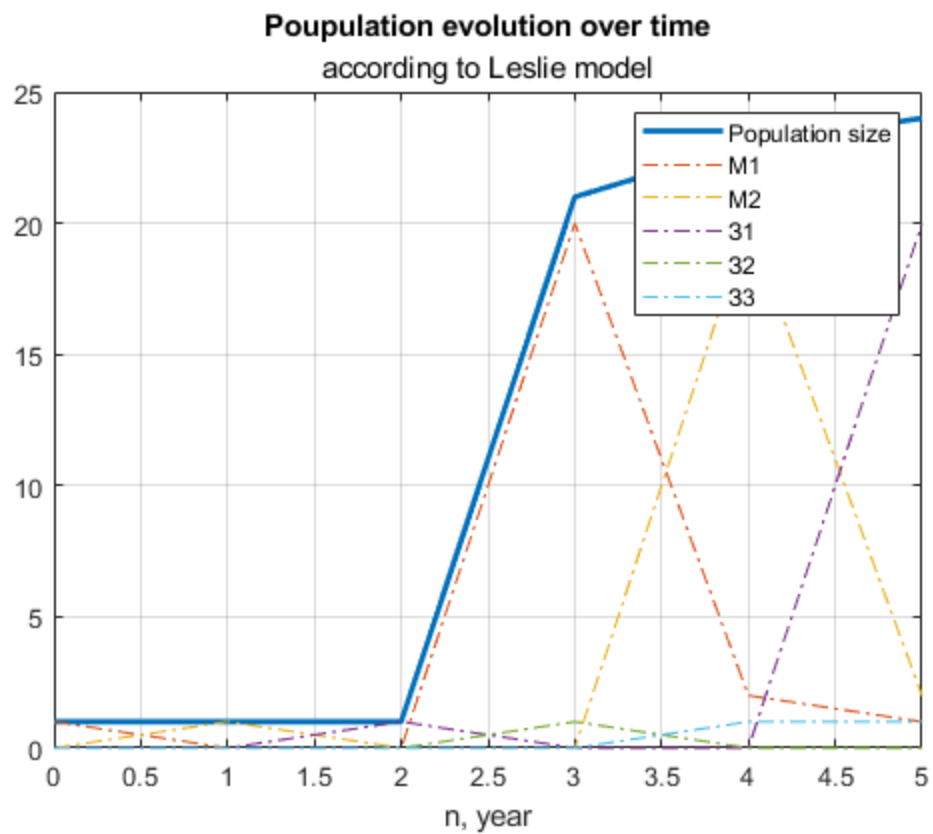
```
#####
Columns 1 through 4
```

```
 0.9288 + 0.0000i   0.9288 + 0.0000i  -0.9317 + 0.0000i   0.0001 +
0.0000i
-0.1695 - 0.2998i  -0.1695 + 0.2998i  -0.3381 + 0.0000i  -0.0020 +
0.0000i
-0.0659 + 0.1094i  -0.0659 - 0.1094i  -0.1227 + 0.0000i   0.0380 +
0.0000i
 0.0473 + 0.0013i   0.0473 - 0.0013i  -0.0445 + 0.0000i  -0.7244 +
0.0000i
-0.0098 - 0.0104i  -0.0098 + 0.0104i  -0.0253 + 0.0000i   0.6883 +
0.0000i
```

Column 5

```
-0.0423 + 0.0000i
-0.0445 + 0.0000i
-0.0469 + 0.0000i
-0.0493 + 0.0000i
 0.9958 + 0.0000i
```

```
#####
-0.9317
-0.3381
-0.1227
-0.0445
-0.0253
```



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