Operations

$x + y$ addition
$x - y$ substraction
$x. * y$ scalar product
$x * y$ vectorial product
$x.\hat{}\ y$ power

Vectors

$x = [1\ 2\ 3]$ create a row vector
$x = [2; 1; 5]$ create a column vector
$x = 1 : 10 : 1000$ vector from 1 to 1000, by 10

Matrix

$A = [1\ 2\ 3; 4\ 5\ 6; 7\ 8\ 9]$ 3x3 matrix
$B = zeros(2, 3)$ 2 rows and 3 colums of 0
$C = ones(2, 3)$ 2 rows and 3 colums of 1
$D = A'$ transpose of the matrix
$eig(A)$ eigenvalues of A

Plot

$plot(x, y, '*')$ plot y as a function of x with *
$hold\ on, hold\ off$ open or not a new figure
$xlabel('Myxlabel')$
$ylabel('Myylabel')$

Control flow

$for\ dummy = first : last$
  $x[dummy] = dummy + 1;$
end
$if\ a > b$
  $y = a + b;$
$else$
  $y = a - b;$
end
$while\ i < j$
  $i = i + 1;$
end

A generic function

$[out1, out2...] = function(in1, in2, ...)$

Leslie

$rate = leslie(leslieMatrix, popVectorInit)$

Density independent growth

$rate = discrete(\lambda, n)$

Density dependent growth

$popSize = ricker(r, Ninit, K)$

Competition

$global\ r\ k\ alpha$ Only once
$r = [r_1 r_2];$ Growth rate
$k = [k_1 k_2];$ Carrying capacity
$alpha = [\alpha\ \beta];$ Competition
$n = [N_1 N_2];$ Initial population size
$plotlv(n)$ Make graph

Competition 2 resources

$global\ s\ j\ cA\ cB\ m$ Only once
$s = [s_1 s_2];$ Supply point
$cA = [c1c2];$ Consumption rate of A
$cB = [c1c2];$ Consumption rate of B
$m = [m_A m_B];$ Mortality
$j = [j_1 j_2 j_3 j_4];$ Half saturation
$n = [N_A N_B];$ Initial population size
$R = [R_1 R_2];$ Initial resource available
$tilman(n, R)$ Make graph

Predator-prey

$global\ r\ a\ p\ m$ Only once
$r =$ Prey growth rate
$p =$ Capture effiency
$a =$ Conversion of biomass
$m =$ Predator mortality
H Number of prey
P Number of predator
$lotka(H, P)$ Make graph

Rosenzweig-MacArthur

$global\ r\ a\ q\ c\ m\ K$ Only once
$r =$ Prey growth rate
$a =$ Conversion of biomass
$q =$ Feeding rate
$c =$ Half saturation
$m =$ Predator mortality
$K =$ Prey carrying capacity
H Number of prey
P Number of predator
$RM2(H, P)$ Make graph type II
$RM3(H, P)$ Make graph type III

SIR

$global\ d\ D\ beta\ gamma\ v$ Only once
$d =$ Death rate non-infcted
$D =$ Death rate infcted
$beta =$ Transmission rate
$gamma =$ Recovery rate
$v =$ Vaccination
S Susceptible
I Infected
R Recovered
$SIR(S, I, R)$ SIR model
$SIRv(S, I, R)$ SIRv model

Food chain

$gurneychain$ Enter values
$phi =$ Photosynthetic primary production
$d* =$ Mortality of *
$a* =$ Predator * efficiency
$P =$ Primary producer
$H =$ Herbivore
$C =$ Predator