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LAMPIRAN

Lampiran 1 Kode Program simulasi menggunakan matlab

```
clear all
close all
clc
% parameter
alpha = 3;
beta = 1;
gamma =2.5  ;
delta = 0.1;
k1 = 0.5;
k2 = 0.5;
phi = 150;
%titik kesetimbangan
upolinomial   =   [beta   beta*k1+gamma*(1-delta)-alpha   gamma*k2*
(1-delta)-alpha*k1];
root_u = roots(upolinomial);
eta = root_u(root_u > 0);
ubar = eta;
vbar = (1-delta)*(eta+k2);
%domain spasial
x= 500;
y= 500;
t= 5000;
dx=1;dy=1;dt=0.001;
Nx=x/dx;Ny=y/dy;Nt=t/dt;
% membuat matriks
u=zeros(Nx,Ny);v=zeros(Nx,Ny);
ua=zeros(Nx,Ny);va=zeros(Nx,Ny);
%%Syarat Awal
for i=1:Nx
    for j=1:Ny
        ua(i,j)= ubar-(2*10^-7)*(i-0.1*j-225)*(i-0.1*j-675);
        va(i,j)= vbar-(3*10^-5)*(i-450)-(1.2*10^-4)*(j-150);
    end
end

%%implementasi skema FTCS
for n=1:Nt-1
    for i=2:Nx-1
        for j=2:Ny-1
fu        =        alpha.*ua(i,j)-beta.*ua(i,j).^2.*gamma.*ua(i,j).*
va(i,j)./(ua(i,j)+k1);
fv = va(i,j)-delta.*va(i,j)-va(i,j).^2./(ua(i,j)+k2);
uxx = (ua(i+1,j) - 2.*ua(i,j) + ua(i-1,j))./dx^2;
vxx = (va(i+1,j) - 2.*va(i,j) + va(i-1,j))./dx^2;
uyy = (ua(i,j+1) - 2.*ua(i,j) + ua(i,j-1))./dy^2;
vyy = (va(i,j+1) - 2.*va(i,j) + va(i,j-1))./dy^2;
spasial_u = uxx + uyy;
spasial_v = vxx + vyy;
u(i,j) = ua(i,j)+dt.*(fu+spasial_u);
v(i,j) = va(i,j)+dt.*(fv+(phi.*spasial_v));

        end
        u(i,1)= u(i,2);
```

```
        u(i,Ny)= u(i,Ny-1);
        v(i,1)= v(i,2);
        v(i,Ny)= v(i,Ny-1);

    end
    for j=1:Ny
        u(1,j)=u(2,j) ;
        u(Nx,j)=u(Nx-1,j) ;
        v(1,j)= v(2,j);
        v(Nx,j)= v(Nx-1,j);
    end
    disp(n);
    ua=u;
    va=v;
end
%Plotting Kepadatan Mangsa
figure(1)
contourf(ua,'LineColor','none');
colormap('jet')
title('Mangsa')
xlabel('x')
ylabel('y')
colorbar
%Plotting Kepadatan Pemangsa
figure(2)
contourf(va,'LineColor','none');
colormap('jet')
title('Pemangsa')
xlabel('x')
ylabel('y')
colorbar
```