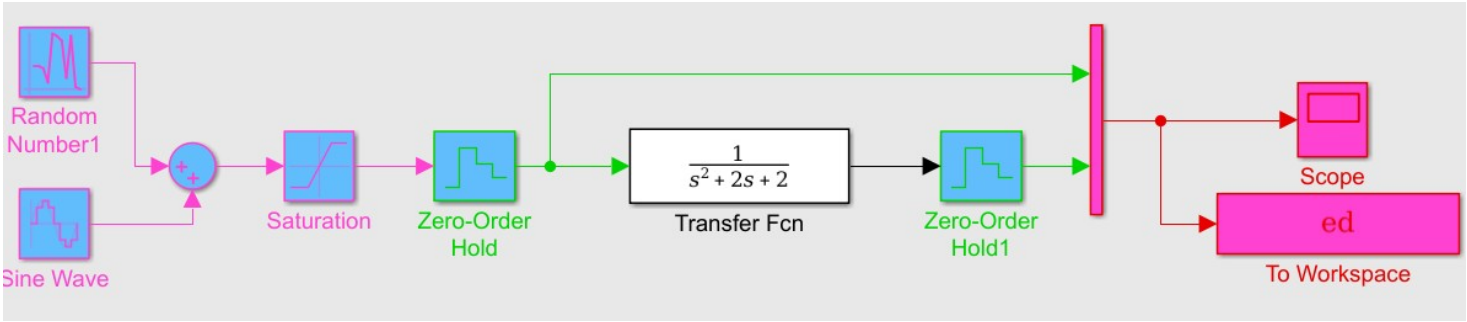
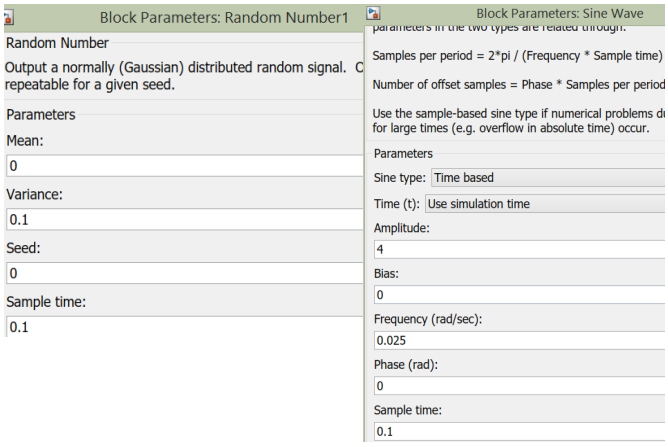
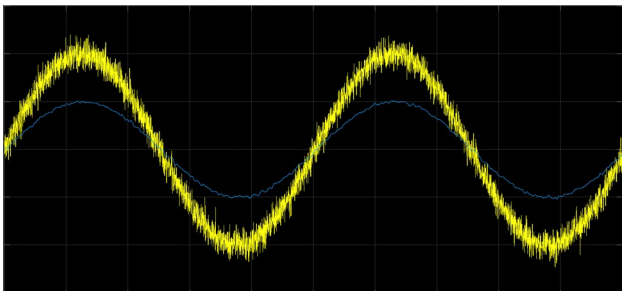
INVERZNA DINAMIKA

a) ulazni signal

vrijeme simulacije t=500



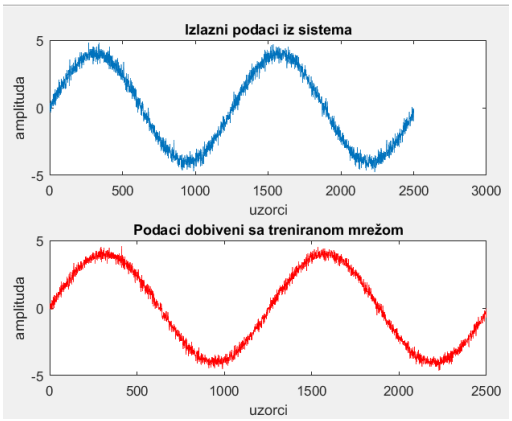


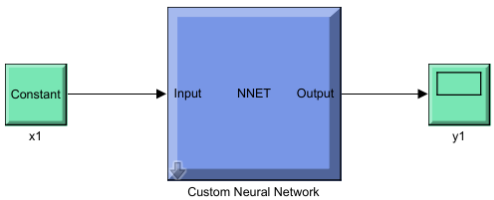


b) Matlab kod

```
N=4;
% Priprema podataka za treniranje mreze
fprintf('Priprema podataka za treniranje mreze...\n');
P= ed(:, 1);
T = ed(:, 2);
minulaz = min(P);
maxulaz = max(P); %opseg ulaznih vrijednosti
minizlaz = min(T);
maxizlaz = max(T);%opseg moguceg izlaza

net = newff([zeros(2*N,1)-1 zeros(2*N,1)+1], ...
[15 5 1],{'tansig','tansig', 'purelin'}, 'trainlm');

net.trainParam.epochs = 2000;
net.trainParam.goal = 2e-9;
net.trainParam.show = 10;
net.trainParam.time = Inf;

fprintf('Opseg ulaza mreze je: [%g, %g].\n', minizlaz,
maxizlaz);

% normiranje ulaza i izlaza na opseg [-1, 1]
```

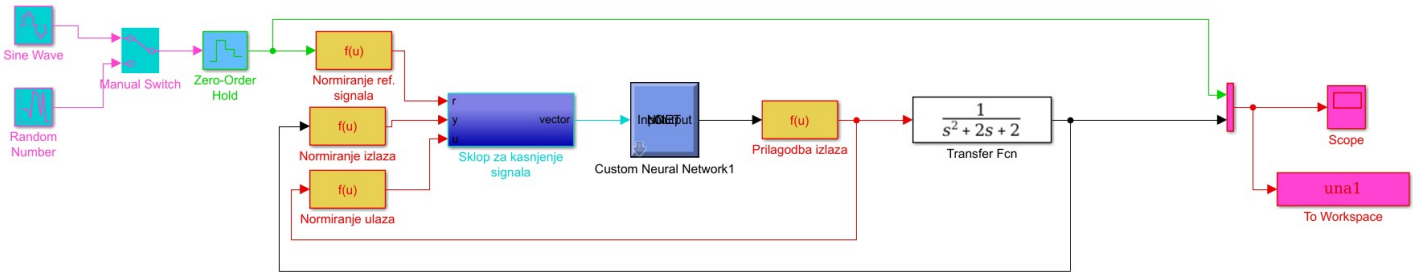
```
P= 2 * (P - minulaz) ./ (maxulaz - minulaz) - 1;
T = 2 * (T - minizlaz) ./ (maxizlaz - minizlaz) - 1;

vel = length(T);
ulaz = zeros(2*N, vel-N);
izlaz = zeros(1, vel-N);

for k = N : vel-1
    t = flipud( T(k-N+1:k+1) );
    p = flipud( P(k-N+1:k-1) );
    ulaz(:,k) = [t; p];
    izlaz(k) = P(k);
end;
% Treniranje...
fprintf('Po?etak treniranja\n');
tic
net = train(net, ulaz, izlaz);
toc

izlaz=sim(net,ulaz);
izlaz=(izlaz+1)*(maxulaz-minulaz)./2 +minulaz;

figure
subplot(2,1,1),plot(ed(:,1));
title('Izlazni podaci iz sistema');
xlabel('uzorci')
ylabel('amplituda')
subplot(2,1,2),plot(izlaz,'r')
title('Podaci dobiveni sa treniranom mrežom');
xlabel('uzorci')
ylabel('amplituda')
gensim(net,0.1)
```

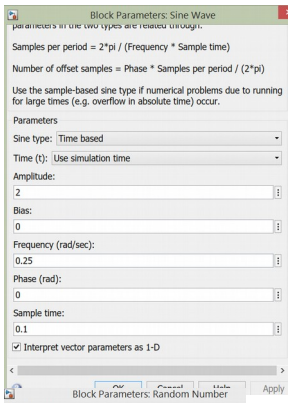


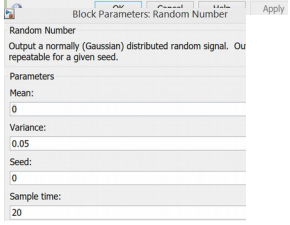


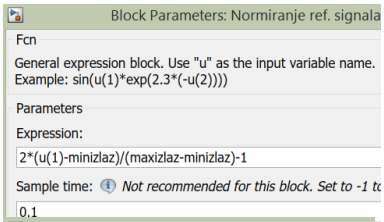
c) završni model

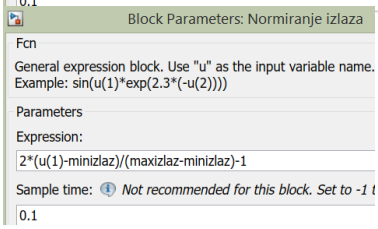
t=500

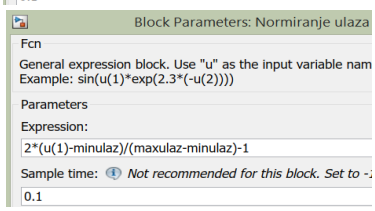


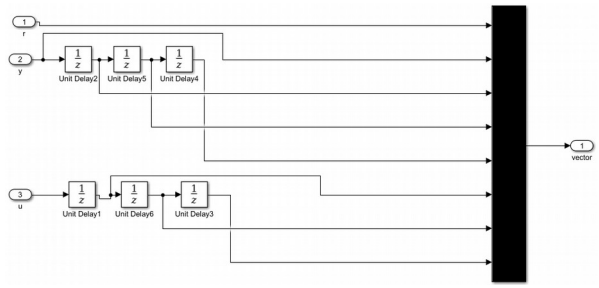


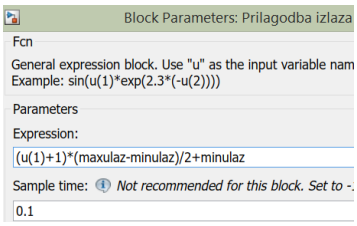


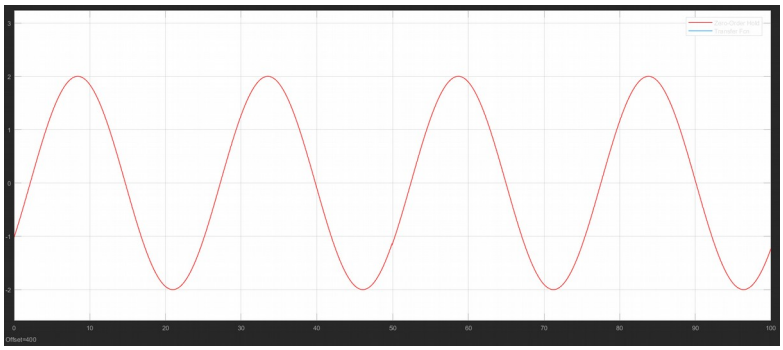




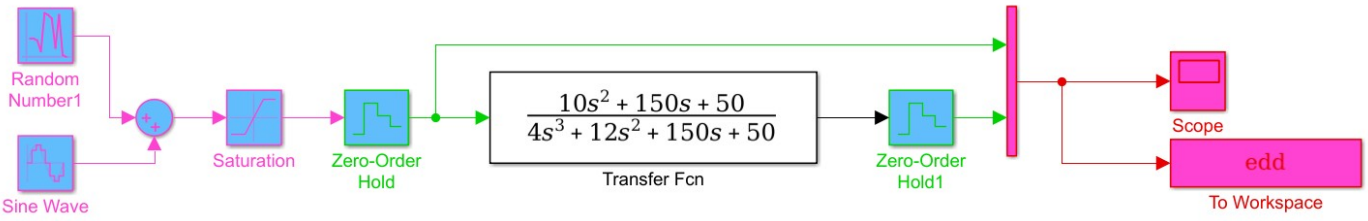


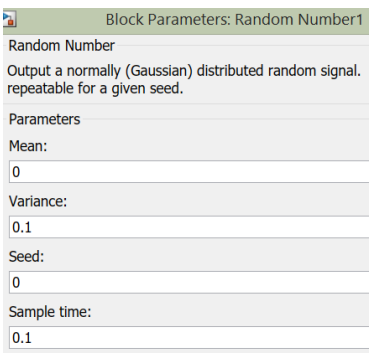


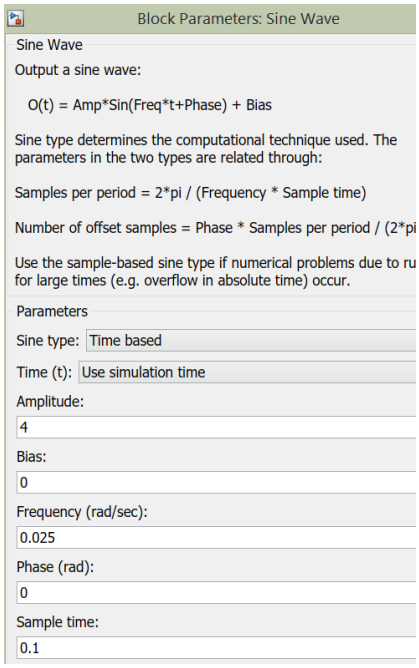


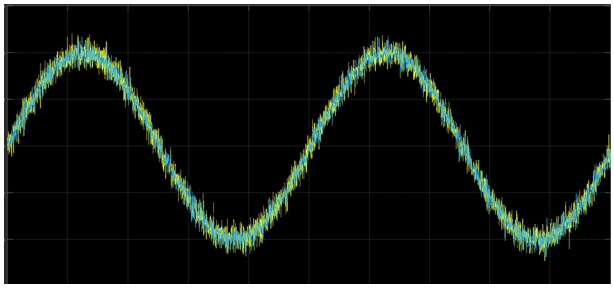


NARKS
t=500







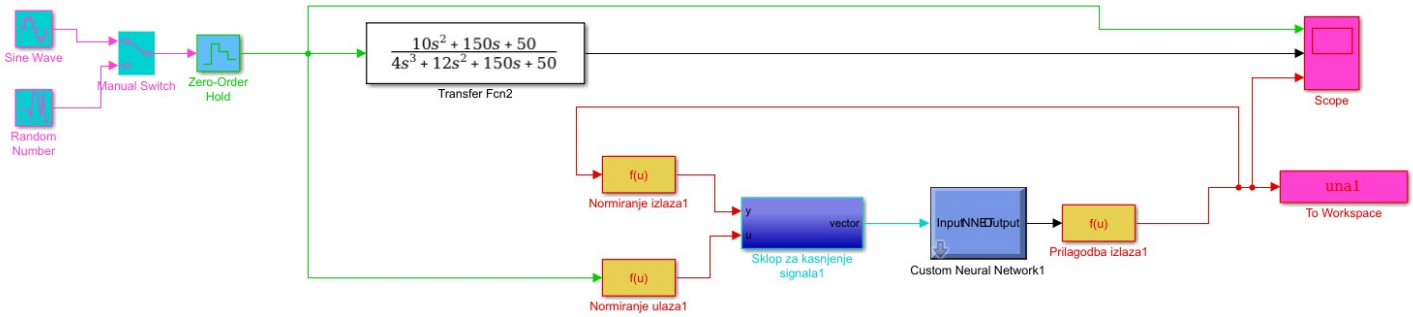


b) Matlab kod

```
P= edd(:, 1);
T = edd(:, 2);
vel = length(P);
minulaz = min(P);
maxulaz = max(P); %opseg ulaznih vrijednosti
minizlaz = min(T);
maxizlaz = max(T);%opseg moguceg izlaza

% normiranje ulaza i izlaza na opseg [-1, 1]
p= 2 * (P - minulaz) ./ (maxulaz - minulaz) - 1;
t = 2 * (T - minizlaz) ./ (maxizlaz - minizlaz) - 1;
N=4;
p=p;
t=t;
for k = N+1 : vel
    t1 = flipud( t(k-N:k-1) );
    p1 = flipud( p(k-N:k-1) );
    ulaz(:,k) = [t1; p1];
    izlaz(k) = t(k)';
end

ulaz
izlaz

net = newff([-1 1;-1 1;-1 1;-1 1;-1 1;-1 1;-1 1;-1 1],[15 1],{'tansig',
'purelin'}, 'trainlm');
```

```
net.trainParam.epochs = 2000;
net.trainParam.goal = 2e-4;
net.trainParam.show = 300;
net.trainParam.time = Inf;
net.performFcn='sse';

% Treniranje...
fprintf('Po?etak treniranja\n');
tic
net = train(net, ulaz, izlaz);
toc

izlaz=sim(net,ulaz);
izlaz=(izlaz+1)*(maxizlaz-minizlaz)./2 +minizlaz;

figure
subplot(2,1,1),plot(edd(:,1));
title('Izlazni podaci iz sistema');
xlabel('uzorci')
ylabel('amplituda')
subplot(2,1,2),plot(izlaz,'r')
title('Podaci dobiveni sa treniranom mrežom');
xlabel('uzorci')
ylabel('amplituda')
gensim(net,0.1)
```

c) Zadnji model



2*(u(1)-minizlaz)/(maxizlaz-minizlaz)-1
2*(u(1)-minulaz)/(maxulaz-minulaz)-1
(u(1)+1)*(maxizlaz-minizlaz)/2+minizlaz