

ДОДАТОК А

Текст програми MDA1 з функціями genMDAmatrix та genMDA1

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function [kR, ind, kB] = MDA1(Nodes, m, M)
if nargin < 3, M = 100; end;
if nargin < 2, m = 20; end;
if nargin < 1, Nodes = 4096; end;
k = zeros(Nodes,1); kA = k; kR = k;
kR1 = k; kR2 = k;
for i = 1:M
    [k,k1] = genMDAmatrix(Nodes,m);
%    k = genMDA1(Nodes,m);
    kA = kA + k;
    kR = kR + sort(k,'descend');
    kR1 = kR1 + sort(k1,'descend');
    kR2 = kR2 + sort(k-k1,'descend');
end
kA = kA / M;
kR = kR / M;
kR1 = kR1 / M;
kR2 = kR2 / M;
n = 1:Nodes;
    last = find(kR > m+0.5, 1,'last');
ind = (m+2 : last)';
    kB = kR(ind);
fresult = fit(ind,kB,'power1');
coef = coeffvalues(fresult);
pred = feval(fresult,n);
Npow = log2(ind);
Ntot = log2(n);
nind = [1:m+1, last+1 : Nodes];
Ntail= log2(nind);
figure(1);plot(Npow,log2(kA(ind)),'o',Ntail,log2(kA(nind)),...
    'o', Ntot,log2(pred),'-'); grid on;
    xlabel('log_2(Age)'); ylabel('log_2(Degree)');
    title(['m = ',num2str(m), ' \beta = ',num2str(-coef(2))]);
figure(2);plot(Npow,log2(kR(ind)),'o',Ntail,log2(kR(nind)),...
    'o', Ntot,log2(pred),'-'); grid on;
    xlabel('log_2(Range)'); ylabel('log_2(Degree)');
    title(['m = ',num2str(m), ' \beta = ',num2str(-coef(2))]);
figure(3); loglog(n,kR1,'o', n,kR2,'o', n,pred,'-'); grid on;
    xlabel('log_2(Range)'); ylabel('log_2(Degree)');
    title(['m = ',num2str(m), ' \beta = ',num2str(-coef(2))]);
end
%
%
function [k,k1] = genMDAmatrix(Nodes, m)
n0 = m + 1;
x = zeros(Nodes);
k = zeros(Nodes,1);
n = 1:n0;
x(n,n) = 1 - eye(n0);
k(n) = m;

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for n = n0:Nodes-1
    if n == Nodes/2, k1 = k; end;
    med = 1 + floor(rand(1)*n);
    ind = randperm(k(med));
    nei = find(x(:,med));
    nei = nei(ind(1:m));
    x(n+1,nei) = 1;
    x(nei,n+1) = 1;
    k(nei) = k(nei) + 1;
    k(n+1) = m;
end;
end
%
%
function k = genMDA1(Nodes, m)
n0 = m + 1;
f = (sqrt(5)-1)/2;
avSize = floor(m^(1-f)*Nodes^f);
x = zeros(Nodes, avSize);
k = zeros(Nodes,1);
for n = 1:n0
    arr = [1:n-1, n+1:n0];
    x(n,1:m) = arr;
end
k(1:n0) = m;
for n = n0:Nodes-1
    med = 1 + floor(rand(1)*n);
    ind = randperm(k(med));
    nei = x(med,ind(1:m));
    k(nei) = k(nei) + 1;
    for i = nei
        x(i,k(i)) = n + 1;
    end
    k(n+1) = m;
    x(n+1,1:m) = nei;
end;
end

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ДОДАТОК Б

Текст функції MDA2

```

function MDA2(Nodes, M)
if nargin < 2, M = 100; end;
if nargin < 1, Nodes = 4096; end;
k = zeros(Nodes,1); kA = k; kR = k;
mMas = [1:5,8,10,12,15,20,30,50,100];
nM = numel(mMas);
mArr = zeros(M, nM);
beta = mArr;
for j = 1:nM
    m = mMas(j);
    for i = 1:M
        kA = genMDAmatrix(Nodes,m);
        kR = sort(kA,'descend');
        last = find(kR > m+0.5, 1,'last');
        ind = (m+2 : last)';
        kB = kR(ind);
        if numel(ind) > 2
            fresult = fit(ind,kB,'power1');
            coef = coeffvalues(fresult);
            beta(i,j) = -coef(2);
            mArr(i,j) = m;
        end
    end
end
betAve = mean(beta);
betMed = median(beta);
figure(1); semilogx(mArr,beta,'ob',mMas,betAve,'x-r',...
    mMas,betMed,'+-m'); grid on;
xlabel('m'); ylabel('\beta');
title(['Nodes = ', num2str(Nodes), ' ens = ', num2str(M)]);
set(gca,'XTick',mMas,'XMinorGrid','off','XMinorTick','off');
gam = 1 + 1./beta;
gamHas = 3*(1-0.43531*exp(-0.11*mMas));
figure(2); semilogx(mArr,gam,'ob', mMas,median(gam),'+-m',...
    mMas,gamHas,'x-k'); grid on;
xlabel('m'); ylabel('\gamma = 1 + 1/\beta');
title(['Nodes = ', num2str(Nodes), ' ens = ', num2str(M)]);
set(gca,'XTick',mMas,'XMinorGrid','off','XMinorTick','off');
end

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ДОДАТОК В

Ведомость аттестационной работы магистра

