

LAMPIRAN A:
M-FILE MATLAB

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% samtest2.m
% tes Algoritma SAM
% Simulasi SAM untuk satu atau lebih dari harga SNR, dan
perhitungannya
% the SAM cost, SSNR, dan bit rate.

% Fungsi Miscellaneous
addpath ../mcmtools

% DMT TEQ toolbox
addpath ../teqv3

% parameter-parameter sistem
M = 544; % samples per symbol
nu = 32; % panjang cyclic prefix
%load ../j02_merry/channels/csaloop1.time
load csaloop1.time
c = (csaloop1(:,2));
c = c/norm(c); % kanal unit norm
Lc = length(c)-1; % panjang kanal - 1
Lf = 15; % panjang equalizer - 1
L = Lf+Lc; % panjang kanal yang dikombinasi - 1
sx = 1; % sigma_x
ssx = sx*sx; % kuadrat sinyal
% pilih sepasang yang ada di bawah.
% yang pertama bernilai 9 SNR dan kinerja plot berbanding waktu
% untuk harga kelima dari SNR.
% proses keduadari harga single SNR.
%SNRs = [20:5:60]; % dalam dB
%plotme = 5; % plot index SNR berbanding waktu
SNRs = 40; % dalam dB
plotme = 1; % plot index SNR berbanding waktu

% parameter-parameter algoritma
iter = 75; % banyaknya symbol (tiap M sampel)
mu = 5; % unit step SAM
offset = Lf+1+L; % data averaging window location
N = 32; % data averaging window size
alpha = 1/100; % penjumlahan AR implementation
ARon = 1; % flag: 0 = MA, 1 = AR implementation
cnst = 0; % constraint (see samiterar.m)
finit = zeros(Lf+1,1); % inisialisasi equalizer
finit(ceil(Lf/2)) = 1; % (single spike)

% solusi maximum shortening SNR
% (solusi tidak tergantung pada noise,
% meski kinerja telah ditunjukkan)
[fmelsa,dopt_mel,dummy] = mssnr(c,nu+1,Lf+1,1,L-nu-1,0);
hmel1 = conv(c,fmelsa).';
hmel = hmel1/norm(hmel1); % unit norm
Rhh = conv(hmel,flip1r(hmel));
Rhh = Rhh((length(Rhh)+1)/2 : end); % dilihat dari satu sisi
Jsam_mel = sum( (Rhh(nu+1 +1 : end)).^2 );
Jssnr_mel = 1/ssnr2(hmel,nu);
%finit = fmelsa;

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fmtx = zeros(Lf+1,length(SNRs));
Jsammtx = zeros(1,length(SNRs));
Jssnrmtx = zeros(1,length(SNRs));
Jbrmtx = zeros(1,length(SNRs));
BR_mel = zeros(1,length(SNRs));
BR_MFB = zeros(1,length(SNRs));

for SNRind = 1:length(SNRs)
%-----
SNR = SNRs(SNRind)
g = 10.^(-SNR/10); % 1/SNR dalam skala linier
sn = sx*sqrt(g); % sigma_n
ssn = sn*sn; % pangkat noise

% peningkatan data ADSL yang diterima
r = adslout(c,sx,sn,iter);

% hanya melakukan perhitungan harga untuk satu SNR if SNRind ==
plotme
    flag1 = 1;
else
    flag1 = 0;
end

% proses SAM untuk mendapatkan equalizer dank anal yang
diperpendek
if ARon
    params = [mu,alpha,nu,Lc,cnst,sx,sn,flag1];
    % estimasi auto-regressive
    [f,Jsam,Jssnr,BR] = samiterar(finit,r,c,params);
else
    params = [offset,mu,N,nu,Lc,cnst,sx,sn,flag1];
    % blok (penjumlahan)estimasi
    [f,Jsam,Jssnr,BR] = samiter(finit,r,c,params);
end
kmax = length(Jsam);

if SNRind == plotme
    JsamP = Jsam;
    JssnrP = Jssnr;
    BRP = BR;
    comb = conv(c,f);
end

% simpah hasil
fmtx(:,SNRind) = f;
Jsammtx(SNRind) = Jsam(end);
Jssnrmtx(SNRind) = Jssnr(end);
Jbrmtx(SNRind) = BR(end);
BR_mel(SNRind) = sum(bitrate(hmell.',fmelsa,nu,dopt_mel,ssx,ssn));
BR_MFB(SNRind) = sum(mfb(c,ssx,ssn));

%-----
end
% SNR loop
clear f; clear Jsam; clear Jssnr; clear BR;

% hasil performa

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SNRs
Jsammtx
Jssnrmtx
Jbrmtx/(246.4) %dalam Mbps
BR_mel/(246.4) %dalam Mbps
BR_MFB/(246.4) %dalam Mbps

% string for x-axis label
if ARon
    xstr = 'sample number, n';
else
    xstr = 'averaging block number, k';
end

% menunjukkan plot harga SNR "plotme"

% plot SAM berdasarkan waktu
figure(1);
clf;
set(0,'DefaultAxesFontSize',16);
semilogy(1:kmax,JsamP,'b-','LineWidth',2);
title('SAM cost vs. iteration number','FontSize',16);
xlabel(xstr,'FontSize',16);
ylabel('J_S_A_M','FontSize',16);
axis([0 kmax 1e-11 1e-4]);
grid on

% plot 1/SSNR berdasarkan waktu
figure(2);
clf;
set(0,'DefaultAxesFontSize',16);
semilogy(1:kmax,JssnP,'b-','...
    [0:kmax],Jssnr_mel*[1,1],'k--','LineWidth',2);
title('1/SSNR cost vs. iteration number','FontSize',16);
xlabel(xstr,'FontSize',16);
ylabel('1/SSNR','FontSize',16);
legend('SAM','MSSNR',0);
axis([0 kmax 1e-7 1e-1]);
grid on

% plot bit rate berdasarkan waktu
Ts = 246.4 * 10^(-6); % symbol duration, including CP
figure(3);
clf;
set(0,'DefaultAxesFontSize',16);
plot(1:kmax,BRP/Ts,'b-','...
    [0:kmax/10:kmax],BR_mel(plotme)/Ts*ones(11,1),'k--','...
    [0:kmax/10:kmax],BR_MFB(plotme)/Ts*ones(11,1),'kd-','...
    'LineWidth',2);
%plot([1:kmax]/M,BRP/Ts,'b-','...
% [0:kmax/10:kmax]/M,BR_mel(plotme)/Ts*ones(11,1),'k--','...
% [0:kmax/10:kmax]/M,BR_MFB(plotme)/Ts*ones(11,1),'kd-','...
% 'LineWidth',2);
title('bit rate vs. iteration number','FontSize',16);
xlabel(xstr,'FontSize',16);
%xlabel('symbol number','FontSize',16);
ylabel('bits per second','FontSize',16);
legend('SAM','MSSNR','MFB',0);

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yax = axis;
axis([0 kmax 0 yax(4)]);
%axis([0 kmax/M 0 yax(4)]);
grid on

% plot respon impuls equalizer dank anal diperpendek
figure(4);
clf
set(0,'DefaultAxesFontSize',16);
plot(0:Lc,c,'r--', 0:L,comb,'b-','LineWidth',2);
title('Results of SAM on CSA loop 1','FontSize',16);
xlabel('tap number','FontSize',16);
ylabel('tap values','FontSize',16);
legend('channel','shortened channel',1);
axis([0 200 -0.15 0.35]);
grid on

% plot bit rates berbanding SNR
figure(5);
clf
set(0,'DefaultAxesFontSize',16);
plot(SNRs,Jbrmtx/Ts,'b-', SNRs,BR_mel/Ts,'k--',...
     SNRs,BR_MFB/Ts,'kd-','LineWidth',2);
title('achievable bit rate','FontSize',16);
xlabel('SNR, in dB','FontSize',16);
ylabel('bits per second','FontSize',16);
legend('SAM','MSSNR','MFB',2);
grid on

% plot equalizer
figure(6);
clf
set(0,'DefaultAxesFontSize',16);
stem([0:Lf],fmtx(:,plotme));
hold on
stem([0:Lf]+0.25,fmelsa/norm(fmelsa),'filled');
hold off
title('TEQ taps','FontSize',16);
xlabel('tap number','FontSize',16);
ylabel('tap value','FontSize',16);
%legend('SAM','MSSNR',1);
grid on

% plot sam dan bit rate berdasarkan waktu
figure(7);
clf;
set(0,'DefaultAxesFontSize',16);
subplot(2,1,1);
semilogy(1:kmax,JsamP,'b-','LineWidth',2);
%title('SAM cost vs. iteration number','FontSize',16);
%xlabel(xstr,'FontSize',16);
ylabel('SAM cost','FontSize',16);
axis([0 kmax 1e-11 1e-4]);
grid on
subplot(2,1,2);
plot(1:kmax,BRP/Ts/1e6,'b-',...
     [0:kmax/10:kmax],BR_mel(plotme)/Ts/1e6*ones(11,1),'k--',...
     [0:kmax/10:kmax],BR_MFB(plotme)/Ts/1e6*ones(11,1),'kd-',...

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        'LineWidth',2);
%title('bit rate vs. iteration number','FontSize',16);
xlabel(xstr,'FontSize',16);
ylabel('bit rate (Mbps)','FontSize',16);
legend('SAM','MSSNR','MFB',0);
yax = axis;
axis([0 kmax 0 yax(4)]);
grid on

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LAMPIRAN B:
Gambar Hasil Simulasi Pengujian



