

**LAMPIRAN**  
**LIST PROGRAM**

**Program utama untuk melihat sinyal yang dikirim, sinyal yang ada *echonya* dan sinyal yang sudah di *cancel*.**

```

clear all;
clc;
clf;
close all;
%*****
N = 64;
L = 16;
P = L;
M = 32;
R = 10;
B = N+M-L;
%*****
F = fft(eye(M));
Finv = ifft(eye(M));
G1 = [zeros(M-L,M-L) ];
%*****
G2 = F*[eye(P) zeros(P,M-P)
        zeros(M-P,P) zeros(M-P,M-P)]*Finv;
%G2 = eye(M);

type = 0;

%*****
K = 0;
w(1:N,1) = K*[ones(N,1)];
for p = 0:(N/P)-1
    W_p(1:M,p+1) = F*[w((p*P)+1 : (p+1)*(P),1)
                    zeros(M-P,1)];

```

```
end
%*****
% [x1] = getsound;
[x1 fs1 bit1]=wavread('satu');

% [s] = getsound2;
[s fs2 bit2]=wavread('dua');
t = 0:length(x1);

xw = x1;
d = xw + s ;
%*****
TB = floor(log2(length(t)));
TBL = 2^TB;
%*****
figure(1);
plot(t(1:TBL),x1(1:TBL));grid;
hold on;
%figure(2);
plot(t(1:TBL),d(1:TBL),'r-');grid;
%figure(3);
plot(t(1:TBL),s(1:TBL),'g+');grid;
title('Grafik Sinyal Suara di Jalur Transmitter');
legend('sinyal pengirim, x','d = s + (w*x)','sinyal penerima, s');
%close ;
%plot noise
figure(4);
plot(xw(1:TBL));grid;
title('Signal from loudspeaker')
%close ;
%*****
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x = [zeros(1,(N + M - 2*L)) x1']; % Zero pad dengan N + M - 2*L zeros

%*****

for a = 1:TBL/L

    xhold(1:B,1) = [x(((a-1)*L + 1) : ((a-1)*L + B))]' ;
    for p = 0:1:(N/P)-1
        x_p(1:M,p+1) = xhold((B - p*P - M + 1):(B - p*P),1);
        X_p(1:M,p+1) = F*x_p(1:M,p+1);

    end

    Del = calculate_step_size(X_p,M,N/P,type);

    dd(1:L,1) = d(((a-1)*L + 1) :(a*L))';
    d_l(1:M,1) = [zeros(M-L,1)
                 dd ];
    temp1 = 0;
    for p = 0:1:(N/P)-1
        temp1 = temp1 + [diag(X_p(1:M,p+1))*F]./M^2;
    end

    B_1(1:M,1:M) = real(eye(M) - [G1*Finv*temp1] ) ;
    temp2 =0;
    for p = 0:1:(N/P)-1
        temp2 = temp2 + [(diag(X_p(1:M,p+1))*W_p(1:M,p+1))]./M;
    end

    y(1:M,1) = real(G1*Finv*temp2);
    e(1:M,1) = d_l(1:M,1) - y(1:M,1);
    c(1:M,1) = e(1:M,1);

```

```
for r = 2:R

    e(1:M,r) = B_1(1:M,1:M)*e(1:M,r-1);
    c(1:M,r) = c(1:M,r-1) + e(1:M,r);
end

for p = 0:1:(N/P)-1
    temp(1:M,1) = 0;
    temp(:, :) = W_p(1:M,p+1) + [G2*Del*diag(conj())]*F*c(1:M,R)]./M;
    W_p(1:M,p+1) = temp;
end

y_out(((a-1)*L + 1) : (a*L)) = (y((M-L + 1): M,1))';
e_out(((a-1)*L + 1) : (a*L)) = (e((M-L + 1): M,1))';

end

t = 1:TBL;
figure(5);
plot(t,y_out);grid;
title('y_out');
figure(6);
plot(t,e_out);hold;
plot(s,'r');grid;
legend('e(n)', 's(n)');
title('Sinyal Suara di Jalur Penerima');

for p = 1:1:(N/P)
    B_w((p-1)*P+1:p*P,1) = W_p(1:P,p);
end
```

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```
b_alg = ifft(B_w);
figure(7);
plot(1:N,real(b_alg));grid;
title('Grafik Selisih Sinyal Echo  $r(n)$  dan Sinyal Replika  $\hat{u}(n)$ ');

wavplay(x1,fs1);pause(1)
wavplay(s,fs1);pause(1)
wavplay(d,fs1);pause(1)
wavplay(y_out,fs1);pause(1)

% wavplay(e_out,fs1);pause(1)

% wavplay(d'-y_out',fs1);
% *****
```

**Program menggabungkan sinyal suara**

```
clc;
clear all;
close all;
clc;

[a1 fs1 bit1]=wavread('satu');

[a2 fs2 bit2]=wavread('dua');

a=[a1];
wavwrite(a,fs1,bit1,'satu');

b=[a2];
wavwrite(b,fs1,bit1,'dua');

x=wavread('satu');
wavplay(x,fs1)
pause(1)
y=wavread('dua');
wavplay(y,fs1)

z= x+y;
wavwrite(z,fs1,bit1,'tiga');
x=wavread('tiga');
```