PROGRAM KOMPUTASI PEMODELAN REGRESI WEIBULL
PADA DATA DO SUNGAI MAHAKAM 2021
MENGGUNAKAN SOFTWARE OCTAVE

```
clc; clear all;
pkg load io

data = input('Inputkan_Data_Pokok=');
% Contoh: xlsread('D:\Hibah Penelitian 22\DO_21_an.xlsx');
Ordo_Data=size(data);
J_c=Ordo_Data(2); %%banyaknya Kolaom matriks data %%%
y=data(:,1);
delta=data(:,2); %%% data status dari variabel respon%%%
n=length(y);
X0=ones(n,1);

%%%%Input Data Kovariat Satu Per Satu %%%
X1=data(:,3); X2=data(:,4); X3=data(:,5);X4=data(:,6);
X5=data(:,7); X6=data(:,8); X7=data(:,9); X8=data(:,10);
Xv=input('Inputkan_Kombinasi_Kovariat='); % Contoh [X2, X4, X8)];
X=[X0,Xv];
prl=length(X(1,:)); %%Banyaknya kolom Matriks X termasuk X0%%
pr=1+prl;
Gam_0=input('Inputkan_Vektor_Nilai_Awal_Gamma='); %%Contoh [1:0.1:7.0]; %%
Lam_0=input('Inputkan_Vektor_Nilai_Awal_Lamda='); %%Contoh [2:0.1:5]; %%
m1=length(Gam_0);
m2=length(Lam_0);

tetha_topi=zeros(pr,1); %% Pesan tempat vektor tetha topi%%%
for j=1:m1
    gm0=Gam_0(j);
    for j2=1:m2
      lm0=Lam_0(j2);
      B0=zeros(prl,1); %% Nilai awal parameter betha%%%
      thb=[gm0;B0]; %%% thb = tetha baru %%
      thb(2)=thb(1)*log(lm0);
      epsilon=10^(-12); %% sebagai contoh %%
      I_max=input('Inputkan_Banyaknya_Iterasi=');
      q0=50; % 50 SEBEGAI CONTOH %%
      for q=1:I_max
            q
            thl=thb;
            gm=thl(1);
            B=thl(2:pr);
            BX=X*B;

%%% Membentuk Vrktor Gradien %%%%
      g=zeros(pr,1); %%%
      dLdgm=delta.*((ones(n,1)/gm)+log(y))-(y.^gm).*log(y).*exp(-BX);
      g(1)=sum(dLdgm);
      for k=1:prl;
            dLdbk=-delta.*X(:,k)+X(:,k).*(y.^gm).*exp(-BX);
            g(k+1)=sum(dLdbk);
      end
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    %%%Membentuk Matriks Hessian%%%
      H=zeros(pr,pr);
      d2Ldgm2= -delta/(gm^2)-((log(y)).^2).*y.^gm.*exp(-BX);
      H(1,1)=sum(d2Ldgm2);
      for k=1:prl;
            d2Ldbdgm=X(:,k).*log(y).*(y.^gm).*exp(-BX);
            H(1,k+1)=sum(d2Ldbdgm);
      end
      for u=1:prl
      for v=1:prl-u+1
          d2dBkdB1=-X(:,u).*X(:,v+u-1).*(y.^gm).*exp(-BX);
      H(u+1,u+v)=sum(d2dBkdB1);
      end
end
    for j=1:pr-1
      for i=1:pr-j
        H(i+j,j)=H(j,i+j);
      end
   end

%%% Menjalankan iterasi N-R %%
thb=thl-H\g;
nrm=norm(thb-thl);
       if nrm<epsilon  %%% Kondisi Konvergensi iterasi N-R %%
             if thb(1)>0
                  if ones(1,pr)*H*ones(pr,1)<0
                  break
                  end
             end
       end
    end
     if nrm<epsilon %%Kondosi Konvergensi %%
       if thb(1)>0
          if ones(1,pr)*H*ones(pr,1)<0
          break
          end
       end
     end
  end
  if nrm<epsilon
      if thb(1)>0
         if y(1:pr)'*H*ones(pr,1)<0
            tetha_topi=thb; %% Penaksir ML
            FI=-H;
            varkov_tetha_topi=-inv(H); %%% Var dari Tetha_Topi %%%
            lm0; %%%Harga awal parameter Gamma%%%%
            gm0; %%%Harga Awal parameter Lammda %%%
            break
         end
      end
   end
end

tetha_topi=thb;
tetha_topi;
betha_topi=tetha_topi(2:pr);
B1_topi=tetha_topi(3:pr);
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varkov_tetha_topi=-inv(H);
varkov_B1_topi=varkov_tetha_topi(3:pr,3:pr);
var_betha_topi=zeros(prl,1);
for k=1:prl
    var_betha_topi(k)=varkov_tetha_topi(k+1,k+1);
end
var_betha_topi;
SE_betha_topi=sqrt(var_betha_topi)
SE_betha_topi;

disp(sprintf('\n============================================================'))
disp('Penaksir Vektor Parameter Model Regresi Weibull Univariat')
disp(sprintf('\n============================================================'))
tetha_topi
disp(sprintf('\n============================================================'))
betha_topi

%%%Uji_Setentak%%%
Stat_G=B1_topi'*inv(varkov_B1_topi)*B1_topi;
db = length(Xv(1,:));
Chisq_kritis=chi2inv(0.95,db)
if Stat_G > Chisq_kritis
Keputusan_Serentak=1;
else
    Keputusan_Serentak=0;
end
p_value_G=1-chi2cdf(Stat_G,db);

disp(sprintf('\n============================================================
==============='))
disp('Nilai Statistik Wilk Likelihood Ratio Pada Uji Serentak dan Keputusan
Uji')
disp(sprintf('\n============================================================
==============='))
disp(' Stat_G    Chisq_kritis   p_value_G  Keputusan_Uji_Serentak')
disp(sprintf('%8.4f     %6.4f  %11.4f %15.4f', Stat_G,
Chisq_kritis,p_value_G, Keputusan_Serentak))
disp(sprintf('\n============================================================
==============='))
disp('keterangan : 0 = H0 gagalditolak,    1 = H0 ditolak')

%%%%% UJI Parsial %%
Stat_W=abs(betha_topi./SE_betha_topi);
pvalue=2*(1-normcdf(Stat_W,0,1));
disp(sprintf('\n============================================================'))
disp('Statistik Wald UjiParsial Model RWU')
disp(sprintf('\n============================================================'))
Stat_W=Stat_W
disp(sprintf('\n============================================================'))
disp('keterangan : H0 ditolakjika Stat_|W0| >Ztabel = 1.96')

p_value=pvalue
disp(sprintf('\n============================================================'))

varkov_tetha_topi
var_betha_topi;
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SE_betha_topi;

%%%%%%%%%%%%%% NILAI AIC %%%%%%%%%%%%%%%%
gm_Topi=tetha_topi(1);
B_Topi=betha_topi;
K=1+db;
lngm=log(thb(1));
AICi=delta.*(ones(n,1)*log(thb(1))+(gm_Topi-1)*log(y)-X*B_Topi)-
(y.^(gm_Topi)).*exp(-X*B_Topi);
AIC=-2*sum(AICi)+2*K

%%%%%Rasio Untuk Interpretasi%%%%%%%%%%
  gm_Topi=thb(1);
  format short
  y1=linspace(0,10,1000);
  S0=exp((-y.^(gm_Topi)).*exp(-X*B_Topi));
  S2=exp((-y.^(gm_Topi)).*exp(-[X0,(X2+ones(n,1)),X4,X8]*B_Topi));
  S4=exp((-y.^(gm_Topi)).*exp(-[X0,X2,(X4+ones(n,1)),X8]*B_Topi));
  S8=exp((-y.^(gm_Topi)).*exp(-[X0,X2,X4,(X8+ones(n,1))]*B_Topi));

  R_S2=S2./S0; %% Rasio Reg Survival Berdasarjakan kovariat X2 %%
  R_S4=S4./S0;
  R_S8=S8./S0;
  R_S=[R_S2,R_S4,R_S8];

  F0=ones(n,1)-S0;
  F2=ones(n,1)-S2;
  F4=ones(n,1)-S4;
  F8=ones(n,1)-S8;

  R_F2=F2./F0;
  R_F4=F4./F0;
  R_F8=F8./F0;
  R_F=[R_F2,R_F4,R_F8];

 %%%%% Rasio Hazard %%%
 h0=gm_Topi*exp(-X*B_Topi).*y.^(gm_Topi-1);
 h2=gm_Topi*exp(-[X0,(X2+ones(n,1)),X4,X8]*B_Topi).*(y.^(gm_Topi-1));
 h4=gm_Topi*exp(-[X0,X2,(X4+ones(n,1)),X8]*B_Topi).*(y.^(gm_Topi-1));
 h8=gm_Topi*exp(-[X0,X2,X4,(X8+ones(n,1))]*B_Topi).*(y.^(gm_Topi-1));
 R_h2=h2./h0;
 R_h4=h4./h0;
 R_h8=h8./h0;
  R_h=[R_h2,R_h4 ,R_h8];

 %%%% Rasio DO%%%
 mu0=gamma((1/gm_Topi)+1)*exp((1/gm_Topi)*X*B_Topi);
 mu2=gamma((1/gm_Topi)+1)*exp((1/gm_Topi)*[X0,(X2+100*ones(n,1)),X4,X8]*B_Topi);
 mu4=gamma((1/gm_Topi)+1)*exp((1/gm_Topi)*[X0,X2,(X4+ones(n,1)),X8]*B_Topi);
 mu8=gamma((1/gm_Topi)+1)*exp((1/gm_Topi)*[X0,X2,X4,(X8+ones(n,1))]*B_Topi);

 R_mu2=mu2./mu0;
 R_mu4=mu4./mu0;
 R_mu8=mu8./mu0;
 R_mu=[R_mu2,R_mu4,R_mu8];
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```
%%%%Rata-rata Poetensi Pencemaran Air%%
R_S0=mean(S0)
R_F0=mean(F0)
R_h0=mean(h0)
R_mu0=mean(mu0)

RR_S=[mean(R_S2),mean(R_S4),mean(R_S8)] %% Rata2 Reg-Surv berd. kenaikan kovariat%%
RR_F=[mean(R_F2),mean(R_F4),mean(R_F8)] %% Rata2 Reg- dist-kum berd. kenaikan kovar%%
RR_h=[mean(R_h2),mean(R_h4),mean(R_h8)] %% Rata2 Reg-hazard berd. kenaikan kovariat%%
RR_mu=[mean(R_mu2),mean(R_mu4),mean(R_mu8)]%% Rata2 DO kenaikan kovariat%%

%%Grafik S, F, h dan mu, sebelum dan setelah kenaikan kovariat %%%
y_S=linspace(3,6,1000);
X_S=[1,mean(X2),mean(X4),mean(X8)];
S0_S=exp((-y_S.^(gm_Topi)).*exp(-X_S*B_Topi));
S8_S=exp((-y_S.^(gm_Topi)).*exp(-[1,mean(X2),mean(X4),(1+mean(X8))]*B_Topi));
S2_S=exp((-y_S.^(gm_Topi)).*exp(-[1,(20+mean(X2)),mean(X4),mean(X8)]*B_Topi));
S4_S=exp((-y_S.^(gm_Topi)).*exp(-[1,mean(X2),(1+mean(X4)),mean(X8)]*B_Topi));
F0_S=1-S0_S;
F2_S=1-S2_S;
F4_S=1-S4_S;
F8_S=1-S8_S;
%%%%%
h0_S=gm_Topi*exp(-X_S*B_Topi).*y_S.^(gm_Topi-1);
h8_S=gm_Topi*exp(-
[1,mean(X2),mean(X4),(1+mean(X8))]*B_Topi).*(y_S.^(gm_Topi-1));
h4_S=gm_Topi*exp(-
[1,mean(X2),(1+mean(X4)),mean(X8)]*B_Topi).*(y_S.^(gm_Topi-1));
h2_S=gm_Topi*exp(-
[1,(1+mean(X2)),mean(X4),mean(X8)]*B_Topi).*(y_S.^(gm_Topi-1));
X2_S= [1:1:n];

%plot(y_S,h0_S)   %%% contoh %%
%hold on
%plot(y_S,h4_S,'r')
%hold off

plot(X2_S,mu0)
hold on
plot(X2_S,mu8,'r')
% hold off
```