%% Cowper-Symonds parameters determination algorithm

% Strain rate for 0.1 mm/s is assumed as static value

% Strain rates for loading velocities: 1 mm/s, 10 mm/s, 100 mm/s and SHPB

eps1=0.01167;

eps10=0.1178;

eps100=0.9456;

eps1000=1000;

% Dynaminc to Static Yield Point ratios for loading velocities

ratio1=1.1531;

ratio10=1.2589;

ratio100=1.4008;

ratio1000=2.6;

C=0.01; % Initial Value of C parameter

P=0.01; % Initial Value of P parameter

tol=0.0002; % Initial tolerance for iteration process

% Implementation of Cowper-Symonds equation for investigated strain rates

w1(1)=1+((eps1/C)^(1/P));

w10(1)=1+((eps10/C)^(1/P));

w100(1)=1+((eps100/C)^(1/P));

w1000(1)=1+((eps1000/C)^(1/P));

i=1;

% Iteration procedure for C and P parameters fitting

while P < 10

P=P+0.001;

C=0;

while C < 120

C=C+0.01;

w1=1+((eps1/C)^(1/P));

stop1(i)=(w1-ratio1)/ratio1;

w10=1+((eps10/C)^(1/P));

stop10(i)=(w10-ratio10)/ratio10;

w100=1+((eps100/C)^(1/P));

stop100(i)=(w100-ratio100)/ratio100;

w1000=1+((eps1000/C)^(1/P));

stop1000(i)=(w1000-ratio1000)/ratio1000;

% Condition for saving the optimized values of C and P parameters

if (abs(stop1)<tol & abs(stop10)<tol & abs(stop100)<tol & abs(stop1000)<tol)

C\_final=C

P\_final=P

end

P=P+0.001;

end

end