CODE FOR OPTIMISATION OF COMBINED FUNCTIONS THAT IS MRR AND SURFACE ROUGHNESS:

clear all

close all

Vmin=300;

Vmax=600;

Fmin=0.15;

Fmax=0.25;

Dmin=0.50;

Dmax=1.00;

P = 20;

N = 50;

for i = 1:P

V(i)=Vmin + rand\*(Vmax-Vmin);

F(i)=Fmin +rand\*(Fmax-Fmin);

D(i)=Dmin + rand\*(Dmax-Dmin);

SR(i)=2.57+0.00807\*V(i)+25.0\*F(i)+1.29\*D(i)0.000012\*V(i)\*V(i)+21.8\*F(i)\*F(i)-2.38\*D(i)\*D(i)-0.0444\*V(i)\*F(i)+0.01445\*V(i)\*D(i)-24.9\*F(i)\*D(i);

MRR(i)=-0.023+0.000203\*V(i)+0.14\*F(i)+0.001\*D(i)-0.0\*V(i)^2-1.40\*F(i)^2- 0.152\*D(i)^2-0.00033\*V(i)\*F(i)+0.000213\*V(i)\*D(i)+0.760\*F(i)\*D(i);

Z(i) = MRR (i)+ 1/ (SR(i)\*100);

end

MRR;

SR;

Z;

Zbest = max (Z);

Zworst = min (Z);

for i = 1:P

if Z(i) == Zbest

k=i;

break

end

end

for i = 1:P

if Z(i) == Zworst

j =i;

break

end

end

Vbest=V(k);

Vworst=V(j);

Fbest=F(k);

Fworst=F(j);

Dbest=D(k);

Dworst=D(j);

for n = 1:N

for i = 1:P

Vn(i)=V(i)+rand\*(Vbest-V(i))-rand\*(Vworst-V(i));

Fn(i) = F(i) + rand\*(Fbest - F(i)) - rand\*(Fworst - F(i));

Dn(i) = D(i) + rand\*(Dbest - D(i)) - rand\*(Dworst - D(i));

if Vn(i)< Vmin

Vn(i) = Vmin;

elseif Vn(i)> Vmax

Vn(i)= Vmax;

end

if Fn(i)< Fmin

Fn(i) = Fmin;

elseif Fn(i)>Fmax

Fn(i)= Fmax;

end

if Dn(i)<Dmin

Dn(i) = Dmin;

elseif Dn(i)> Dmax

Dn(i)= Dmax;

end

SRn(i) = -2.57 + 0.00807 \* Vn(i) + 25.0\*Fn(i)+ 1.29\*Dn(i)-0.000012\*Vn(i)\*Vn(i)+21.8\*Fn(i)\*Fn(i)-2.38\*Dn(i)\*Dn(i)-0.0444\*Vn(i)\*Fn(i)+0.01445\*Vn(i)\* Dn(i)-24.9\*Fn(i)\*Dn(i);

MRRn(i) = -0.023 + 0.000203\*Vn(i) + 0.14\*Fn(i) +0.001\*Dn(i) - 0.0\*Vn(i)^2 - 1.40\*Fn(i)^2 - 0.152\*Dn(i)^2 -0.00033\*Vn(i)\*Fn(i) + 0.000213\*Vn(i)\*Dn(i) +0.760\*Fn(i)\*Dn(i);

Zn(i)=MRRn(i)+ 1 /(SRn(i)\*100);

if Zn(i)<Z(i)

Zn(i)= Z(i);

Vn(i) = V(i);

Fn(i) = F(i);

Dn(i) = D(i);

MRRn (i) = MRR(i);

SRn (i) = SR(i);

end

end

Znbest = max (Zn);

Znworst = min (Zn);

for i = 1:P

if Zn(i) ==Znbest

j=i;

break

end

end

Vbest = Vn(j);

Fbest = Fn(j);

Dbest = Dn(j);

MRRbest = MRRn(j);

SRbest = SRn(j);

for i = 1:P

if Zn(i) ==Znworst

k=i;

break

end

end

MRRn;

SRn;

Zn;

Vworst = Vn(k);

Fworst = Fn(k);

Dworst = Dn(k);

Z = Zn;

V = Vn;

F = Fn;

D = Dn;

MRR = MRRn;

SR = SRn;

FF(n) = Znbest;

x(n) = n;

end

plot (x,FF)