

## LAMPIRAN

### LAMPIRAN 1 : Program MATLAB

```
clear all
clc
Juml_Particles = 200 ;
MaxIt          = 80 ;
Juml_Variabel  = 3 ;
c2             = 0.5 ;
c1             = 0.05 ;
w              = 0.05;

Isc=[12170, 12170, 35984] ;
Iscmin = [10530, 10530, 31150] ;
Is=[400, 1680, 231];
for ir=1:Juml_Particles
    for n=1:MaxIt
        fitness=0*ones(ir,n);
    end
end

for ir=1:Juml_Particles
    for k=1:Juml_Variabel
        R1=rand(k,ir);
    end
end
for ir=1:Juml_Particles
    for k=1:Juml_Variabel
        R2=rand(k,ir);
    end
end
for ir=1:Juml_Particles
    fitness_particle=0*ones(ir,1);
end

tb = 0.01;   ta = 1;
tb2 = 0.01;  ta2 = 1;
tb3 = 0.01;  ta3 = 1;

for ir=1:Juml_Particles
    posisi_particle1=tb+(ta-tb)*rand(1,ir);
    posisi_particle2=tb2+(ta2-tb2)*rand(1,ir);
    posisi_particle3=tb3+(ta3-tb3)*rand(1,ir);
    posisi_particle=[posisi_particle1;
                     posisi_particle2;
                     posisi_particle3];
end

v_max1=0.05*(ta-tb); v_min=0;
v_max2=0.5*(ta2-tb2); v_min=0;
v_max3=0.5*(ta3-tb3); v_min=0;
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for ir=1:Juml_Particles
    kec_particle1=(v_max1-v_min).*rand(1,ir)+v_min;
    kec_particle2=(v_max2-v_min).*rand(1,ir)+v_min;
    kec_particle3=(v_max3-v_min).*rand(1,ir)+v_min;
    kec_particle=[ kec_particle1;
                  kec_particle2;
                  kec_particle3];

end

posisi_terbaik_lokal=posisi_particle;

for ir=1:Juml_Particles

    tms1=posisi_particle(1,ir);
    tms2=posisi_particle(2,ir);
    tms3=posisi_particle(3,ir);

    t1 = 0.14*tms1 ./ (((Isc(1)/Is(1)).^0.02)-1) ;
    t2 = 0.14*tms2 ./ (((Isc(2)/Is(2)).^0.02)-1) ;
    t3 = 0.14*tms3 ./ (((Isc(3)/Is(3)).^0.02)-1) ;

    t = t1 +t2+t3;

    fitness_particle(ir)=t;

    if t1 < 0.2
        fitness_particle(ir) = 100 ;
    end
    if t2-t1< 0.2
        fitness_particle(ir) = 100 ;
    elseif t2-t1 > 0.4
        fitness_particle(ir) = 100 ;
    end
    if t3-t2< 0.2
        fitness_particle(ir) = 100 ;
    elseif t2-t1 > 0.4
        fitness_particle(ir) = 100 ;
    end
end

end
fitness_terbaik_lokal=fitness_particle;

[fitness_terbaik_global,indeks]=min(fitness_terbaik_lokal);

for ir=1:Juml_Particles
    posisi_terbaik_global(:,ir)=posisi_terbaik_lokal(:,indeks);
end

kec_particle=w*kec_particle+c1*(R1.*(posisi_terbaik_lokal-
posisi_particle))+c2*(R2.*(posisi_terbaik_global-
posisi_particle));

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posisi_particle = posisi_particle+kec_particle;

for p=1:1
    for ir=1:Juml_Particles
        if posisi_particle(p,ir) > ta(p,1)
            posisi_particle(p,ir)=ta(p,1)-rand;
        elseif posisi_particle(p,ir) < tb(p,1)
            posisi_particle(p,ir)=tb(p,1)+rand;
        end
    end
end
for p=1:1
    for ir=1:Juml_Particles
        if posisi_particle(p,ir) > ta2(p,1)
            posisi_particle(p,ir)=ta2(p,1)-rand;
        elseif posisi_particle(p,ir) < tb2(p,1)
            posisi_particle(p,ir)=tb2(p,1)+rand;
        end
    end
end
for p=1:1
    for ir=1:Juml_Particles
        if posisi_particle(p,ir) > ta3(p,1)
            posisi_particle(p,ir)=ta3(p,1)-rand;
        elseif posisi_particle(p,ir) < tb3(p,1)
            posisi_particle(p,ir)=tb3(p,1)+rand;
        end
    end
end
hfig = figure;
hold on
title('Convergence of PSO Algorithm Graphic');
set(hfig, 'position', [50,40,600,300]);
set(hfig, 'DoubleBuffer', 'on');
hbestplot = plot(1:MaxIt, zeros(1,MaxIt), '-');
xlabel('Iteration');
ylabel('Fitness Function');
hold off
drawnow;

It=1;
while It<=MaxIt

for ir=1:Juml_Particles
    tms1=posisi_particle(1,ir);
    tms2=posisi_particle(2,ir);
    tms3=posisi_particle(3,ir);

    t1 = 0.14*tms1 ./ (((Isc(1)/Is(1)).^0.02)-1) ;
    t2 = 0.14*tms2 ./ (((Isc(2)/Is(2)).^0.02)-1) ;
    t3 = 0.14*tms3 ./ (((Isc(3)/Is(3)).^0.02)-1) ;

    t = t1 +t2+t3;

    fitness_particle(ir)=t;

```

```

    if t1 < 0.2
        fitness_particle(ir) = 100 ;
    end
    if t2-t1 < 0.2
        fitness_particle(ir) = 100 ;
    elseif t2-t1 > 0.4
        fitness_particle(ir) = 100 ;
    end
    if t3-t2 < 0.2
        fitness_particle(ir) = 100 ;
    elseif t2-t2 > 0.4
        fitness_particle(ir) = 100 ;
    end
end

end

for ir=1:Juml_Particles
    if fitness_particle(ir) < fitness_terbaik_lokal(ir)
        fitness_terbaik_lokal(ir) = fitness_particle(ir);
        posisi_terbaik_lokal(:,ir) = posisi_particle(:,ir);
    end
end

[fitness_terbaik_global_particle(It), indeks] =
min(fitness_terbaik_lokal );
if fitness_terbaik_global_particle(It) < fitness_terbaik_global
    fitness_terbaik_global = fitness_terbaik_global_particle;
    for ir=1:Juml_Particles
        posisi_terbaik_global(:,ir) =
posisi_terbaik_lokal(:,indeks);
    end
end

kec_particle = w * kec_particle + c1 * (R1 .* (posisi_terbaik_lokal -
posisi_particle)) + c2 * (R2 .* (posisi_terbaik_global -
posisi_particle));
posisi_particle = posisi_particle + kec_particle;

for p=1:1
    for ir=1:Juml_Particles
        if posisi_particle(p,ir) > ta(p,1)
            posisi_particle(p,ir) = ta(p,1) - rand;
        elseif posisi_particle(p,ir) < tb(p,1)
            posisi_particle(p,ir) = tb(p,1) + rand;
        end
    end
end

for p=1:1
    for ir=1:Juml_Particles
        if posisi_particle(p,ir) > ta2(p,1)
            posisi_particle(p,ir) = ta2(p,1) - rand;
        elseif posisi_particle(p,ir) < tb2(p,1)
            posisi_particle(p,ir) = tb2(p,1) + rand;
        end
    end
end
end

```

```

end
for p=1:1
    for ir=1:Juml_Particles
        if posisi_particle(p,ir) > ta3(p,1)
            posisi_particle(p,ir)=ta3(p,1)-rand;
        elseif posisi_particle(p,ir) < tb3(p,1)
            posisi_particle(p,ir)=tb3(p,1)+rand;
        end
    end
end

fprintf(1,'Iteration: %d, Fitness:
%f\n',It,fitness_terbaik_global_particle)
plotvector=get(hbestplot,'Ydata');
plotvector(It)=fitness_terbaik_global_particle(It);
set(hbestplot,'Ydata',plotvector);
drawnow
It=It+1;

end

td(1) = posisi_terbaik_global(1,1);
td(2) = posisi_terbaik_global(2,1);
td(3) = posisi_terbaik_global(3,1);

fprintf('\n')
fprintf('TDS Relay 1 = %f \n',td(1))
fprintf('TDS Relay 2 = %f \n',td(2))
fprintf('TDS Relay 3 = %f \n',td(3))

```



## LAMPIRAN 2 : Daftar Riwayat Hidup

### DAFTAR RIWAYAT HIDUP



Nama : Muhammad Dimas Farhan Jamil  
Alamat : Jl. Cendrawasih V GB-08 Perum GKA  
TTL : Gresik, 27 Mei 1997

#### - Riwayat Pendidikan

1. SDN Randuagung 3 : 2003 – 2009
2. SMPN 1 Gresik : 2009 – 2012
3. SMAN 1 Gresik : 2012 – 2015
4. UNMUH Gresik : 2016 – 2020

#### - Pertemuan Ilmiah yang dihadiri

- Diklat Pemeliharaan Trafo Tenaga oleh Pusdiklat PLN
- Training Inverter Weintek Touch Screen by HANDAL
- Diklat Arsitektur Relay Proteksi oleh Pusdiklat PLN