LAMPIRAN PEMROGRAMAN MATLAB

```
function W = load_A(ld,alfa,tc)

%...pendefinisian konstanta...

panjang = 0.65;
hi=1e-6;    %ketebalan film input
ho=1e-6;    %ketebalan film output
Lx=20e-3;    %panjang bearing
U=1;        %kecepatan fluida (m/s)
m=0.001;       %viskositas  fluida  dalam  Pa.s(water  kondisi  room
temperature)-diambil dari buku Non-Newtonian Flow and aplied Rheology
hal 4
Pa=0;       %tekanan (atmosfer)
alfa=0.1;  %konstanta slip, b(panjang slip) = alfa x viskositas = 0.02
x 0.001 = 20 mikrometer.
tco=tc;      %critical shear stress

hd=1e-6;    %ketebalan dimple
%ld=100e-6;   %panjang dimple

%...grid definition....

Nx=2000;     %jumlah grid
dx=Lx/Nx;    %panjang grid

for i=1:Nx+1
    A(i)=0;
end

Niter=100000;
tol=0.001;

for iter=1:Niter
    save1=A;

%....
%definition of geometry
%....

for i=1:Nx+1
    x(i)=(i-1)*dx;
    H(i)=hi-(hi-ho)*x(i)/Lx;

    if x(i)<=panjang*Lx

      h(i)=H(i)+(hd/2+(2*hd/pi)*(((sin(pi*x(i)/ld))+(1/3)*sin(3*pi*x(i
      )/ld))+((1/5)*sin(5*pi*x(i)/ld))+((1/7)*sin(7*pi*x(i)/ld))+((1/9
      )*sin(9*pi*x(i)/ld))+((1/11)*sin(11*pi*x(i)/ld))));
    else
        h(i)=H(i);
    end
```

```
    h(1)=H(1)+hd;

    K(i)=(h(i)^3)*(1+(3*A(i)*m)/(h(i)+A(i)*m));
    C(i)=(h(i))*(1+(A(i)*m)/(h(i)+A(i)*m));
    D(i)=A(i)*(h(i)^2)/(h(i)+A(i)*m);
end

%.....
%coefficient of final discretized equation
%.....

for i=2:Nx
    aE(i)=((2*K(i+1)*K(i))/(K(i+1)+K(i)))/dx;
    aW(i)=((2*K(i-1)*K(i))/(K(i-1)+K(i)))/dx;
    aP(i)=aE(i)+aW(i);
    Sc(i)=3*m*U*((C(i-1)-(C(i+1))))+3*m*tco*(D(i+1)-D(i-1));
end

%.....
%Boundary Condition
%.....

P(1)=Pa;
P(Nx+1)=Pa;

%.....
%ADI Method - Line by line TDMA
%.....

for i=1:Nx+1
    %untuk sweep x-direction
    Aj(i)=0;
    Cja(i)=Pa;
end

for iter=1:Niter
    save=P;

    for i=2:Nx
        beta(i)=aW(i);
        Dj(i)=aP(i);
        alpa(i)=aE(i);
        Cj(i)=Sc(i);

        Aj(i)=alpa(i)/(Dj(i)-(beta(i)*Aj(i-1)));

        %mengandung Cj' atau Cja
        Cja(i)=(beta(i)*Cja(i-1)+Cj(i))/(Dj(i)-beta(i)*Aj(i-1));

        %back substitution
        P(i)=Aj(i)*P(i+1)+Cja(i);
    end
```

```
    cormax=0.0;

    for i=1:Nx+1
        res=abs(save(i)-P(i));
        if(res>cormax)
            cormax=res;
        end
    end

    cormax;

    %.....
    %monitor the eror
    %.....

    if(cormax<tol)
        break
    end
end

%.....
%menghitung shear stres tiap nodal
%.....

t(1)=(P(2)-P(1))/(dx)*(h(1)/2)*(1-(A(1)*m/(h(1)+A(1)*m)))-
m*(U+(A(1)*tco))/(h(1)+A(1)*m);

for i=2:Nx
    t(i)=(P(i+1)-P(i-1))/(2*dx)*(h(i)/2)*(1-(A(i)*m/(h(i)+A(i)*m)))-
m*(U+(A(i)*tco))/(h(i)+A(i)*m);
end

t(Nx+1)=(P(Nx+1)-P(Nx))/(dx)*h(Nx+1)*(1-
(A(Nx+1)*m/(h(Nx+1)+A(Nx+1)*m)))-
m*(U+(A(Nx+1)*tco))/(h(Nx+1)+A(Nx+1)*m);

%.....
%menentukan kondisi slip tiap nodal
%.....

for i=1:Nx+1
    if x(i)<=panjang*Lx
        if abs(t(i))>tco
            A(i)=alfa;
        else
            A(i)=0;
        end

    else
        A(i)=0;
    end
end

    cormax=0.0;
```

```
    for i=1:Nx+1
        res=abs(save1(i)-A(i));
        if(res>cormax)
            cormax=res;
        end
    end

    cormax;

    %.....
    %monitor the eror
    %.....

    if(cormax<tol)
        break
    end
end
for (i=1:Nx+1)
    P1(i)=P(i)*ho^2/(m*Lx*U);
    x1(i)=x(i)/Lx;
end

Pjum = sum(P);
Pbalik = Pjum';

Ptot = sum(Pbalik);
W = Ptot*dx*ho^2/(m*U*Lx^2)

end
```