clc;

clear all;

z = [0 0 0 -2.49479E-02 -2.49473E-02 -2.49473E-02 1.68267E-02 9.60586E-03 1.64595E-03 7.90909E-02 6.75550E-02 5.62843E-02];

L = [3.90467E+02 1.10640E+02 8.85940E+01 3.82591E+02 1.07253E+02 8.56026E+01 3.63625E+02 9.90872E+01 7.84376E+01 6.32280E+02 1.59865E+02 1.23717E+02];

xs = [6.0 24.0 42.0 6.0 24.0 42.0 6.0 24.0 42.0];

ys = [0.0 0.0 0.0 60.0 60.0 60.0 120.0 120.0 120.0];

n = length(xs);

D = 1;

format shortG

for i = 1:n

for j =1:n

r(i) = ((xs(j)-xs(i)).^2) + ((ys(j)-ys(i)).^2);

K(i,j) = (1./(D.^2)).\*((r(i))).\*log((r(i)));

end

end

K(isnan(K)) = 0;

n = n+3;

for i = 1:n

for j =1:n

if(i == 1 || j == 1)

Cp(i,j) = 1;

elseif(i == 2 || j == 2)

Cp(i,j) = 0;

elseif(i == 3 || j == 3)

Cp(i,j) = 0;

else

Cp(i,j) = K(i-3,j-3);

end

if(i == 1 && j == 2)

Cp(i,j) = 0;

end

if(i == 1 && j == 3)

Cp(i,j) = 0;

end

if(i == 2 && j == 1)

Cp(i,j) = 0;

end

if(i == 3 && j == 1)

Cp(i,j) = 0;

end

if(i == 1 && j == 1)

Cp(i,j) = 0;

end

end

end

Table, calendar

Description automatically generated

for i = 1:n

for j =1:n

if i == 2 && j>=4

Cp(i,j) = xs(j-3);

end

if i == 3 && j>=4

Cp(i,j) = ys(j-3);

end

if i >= 4 && j==2

Cp(i,j) = xs(i-3);

end

if i >=4 && j==3

Cp(i,j) = ys(i-3);

end

end

end

Cp

xa = [6 18 36 6 18 36 6 18 36 6 18 36];

ya = [12 12 12 36 36 36 60 60 60 96 96 96];

m = length(xa);

D = 1;

for i= 1:m

for j = 1:length(xs)

r(i) = (xs(j) - xa(i)).^2 + (ys(j) - ya(i)).^2;

ka(i,j) = r(i).\*log(r(i));

end

end

for i = 1:m

for j = 1:m

if j == 1

K(i,j) = 1;

end

if j == 2

K(i,j) = xa(i);

end

if j == 3

K(i,j) = ya(i);

end

if j>=4

K(i,j) = ka(i,j-3);

end

end

end

K(isnan(K)) = 0

Table

Description automatically generated

Spline\_load = transpose(K\*(inv(Cp)))\*transpose(L);

A\_load = sum(L)

S\_load = sum(Spline\_load(4:12))

%%%%%%%%%%%%%%%%%%%%%%

from the above values we can see we obtaint the same value for the forces meaning the forces conserve.

%%%%%% disp %%%%%%%%%%

spl\_disp = (K\*inv(Cp)) \* transpose(z);

s\_disp = sum(z)

aer\_disp = sum(spl\_disp)

%%%%%%%%%%%%%%%%%%%%%%%%%

we can see from the above values we can see that the displacements do not conserve

%%%%%%%% slope %%%%%%%%%%

%%%slope\_eq = diff(((xs - xa).^2 + (ys - ya).^2).\*log((xs - xa).^2 + (ys - ya).^2) , xa)

for i = 1:m

for j = 1:length(xs)

% r(i) = (xs(j) - xa(i)).^2 + (ys(j) - ya(i)).^2;

% G(i,j) = 2.\*xa(i) - 2.\*xs(j) + log((xa(i) - xs(j)).^2 + (ya(i) - ys(j)).^2).\*(2.\*xa(i) - 2.\*xs(j));

G(i,j) = 2.\*xs(j) - 2.\*xa(i) - log((xa(i) - xs(j)).^2 + (ya(i) - ys(j)).^2).\*(2.\*xa(i) - 2.\*xs(j));

end

end

for i = 1:m

for j = 1:m

if j == 1

G\_sl(i,j) = 0;

end

if j == 2

G\_sl(i,j) = 1;

end

if j == 3

G\_sl(i,j) = 0;

end

if j>=4

G\_sl(i,j) = G(i,j-3);

end

end

end

G\_sl(isnan(G\_sl)) = 0;

Graphical user interface, application, table

Description automatically generated

slope\_rad = -1 .\* G\_sl\*inv(Cp)\*transpose(z);

alpha = (rad2deg(slope\_rad))'

