

$\pi = 3.14159$  árt  
 kör km  
 $\sigma_H, \sigma_{EH}, \sigma_y \approx 3 \text{ mm}$   
 körület  
 körület  
 körület

```

ClearAll[A1, A2];
L = 600;
a = 200;
b = 220;
P = 40;

Ym = 21000;
Sh = 23.5;

L12 = Sqrt[a^2 + L^2] // N
L34 = Sqrt[b^2 + L^2] // N

632.456
639.062

Sa = a / L12
Ca = L / L12

0.316228
0.948683

Sb = b / L34
Cb = L / L34

0.344255
0.938876

GT = {{-Ca, -Sa}, {-Ca, Sa}, {Cb, -Sb}, {Cb, Sb}}
G = Transpose[GT]

{{-0.948683, -0.316228}, {-0.948683, 0.316228},
 {0.938876, -0.344255}, {0.938876, 0.344255}}

{{-0.948683, -0.948683, 0.938876, 0.938876},
 {-0.316228, 0.316228, -0.344255, 0.344255}}

q = {0, P}

{0, 40}

F = DiagonalMatrix[{L12 / Ym / A1, L12 / Ym / A2, L34 / Ym / A2, L34 / Ym / A1}]

{{0.0301169, 0., 0., 0.}, {0., 0.0301169, 0., 0.},
 {0., 0., 0.0304315, 0.}, {0., 0., 0., 0.0304315}}
  
```

```

K = Simplify[G.Inverse[F].GT];
v = Simplify[Inverse[K].q];
s = Simplify[-Inverse[F].GT.v];

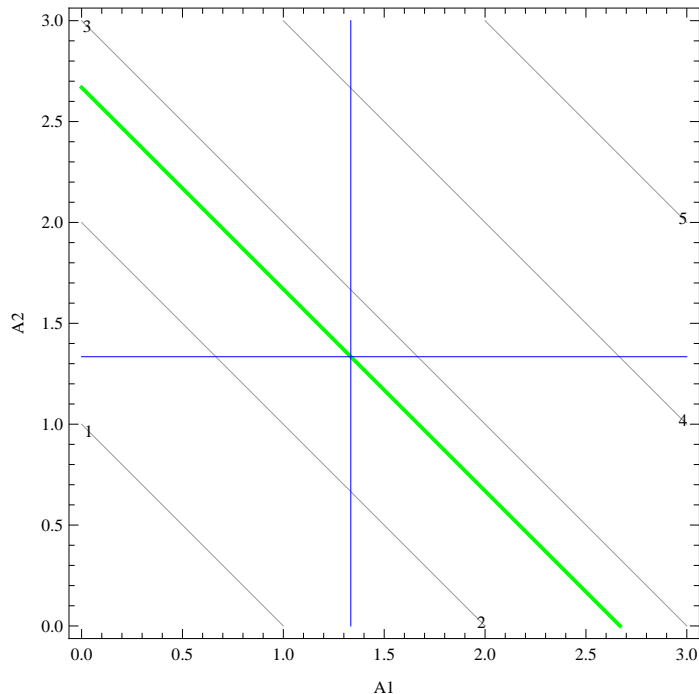
S1 = Simplify[s[[1]] / A1];
S2 = Simplify[s[[2]] / A2];
S3 = Simplify[s[[3]] / A2];
S4 = Simplify[s[[4]] / A1];

Ub = 3;

NMinimize[{A1 + A2, -Sh ≤ S1 ≤ Sh, -Sh ≤ S2 ≤ Sh,
  -Sh ≤ S3 ≤ Sh, -Sh ≤ S4 ≤ Sh, A1 ≥ 0, A2 ≥ 0}, {{A1, 0, Ub}, {A2, 0, Ub}}]
{2.66887, {A1 → 1.33443, A2 → 1.33443}}

p1 = ContourPlot[A1 + A2, {A1, 0, Ub}, {A2, 0, Ub},
  ContourShading → None, FrameLabel → Automatic, ContourLabels → True];
p2 = ContourPlot[A1 + A2 == 2.6688674908656576`, {A1, 0, Ub},
  {A2, 0, Ub}, ContourStyle → {Green, Thick}];
p3 = ContourPlot[{A1 == 1.3344337449177797`, A2 == 1.3344337449177797`},
  {A1, 0, Ub}, {A2, 0, Ub}, ContourStyle → Blue];
Show[
  p1,
  p2,
  p3]

```



```

SE1 = Ym Pi A1 / 4;
SE2 = Ym Pi A2 / 4;

Ub = 40;

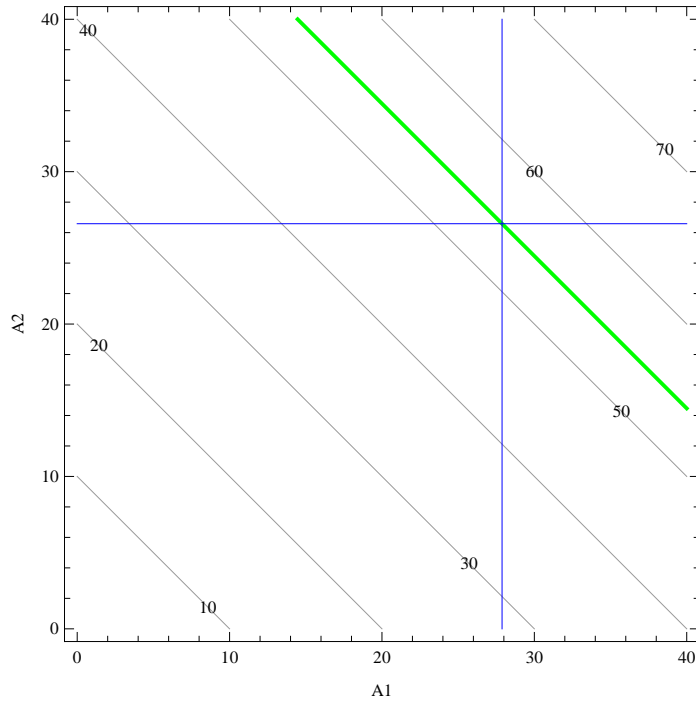
NMinimize[{A1 + A2, -Sh ≤ S1 ≤ Sh, -Sh ≤ S2 ≤ Sh,
  -Sh ≤ S3 ≤ Sh, -Sh ≤ S4 ≤ Sh, -SE2 / L12^2 ≤ S2 ≤ SE2 / L12^2,
  -SE1 / L34^2 ≤ S4 ≤ SE1 / L34^2, A1 ≥ 0, A2 ≥ 0}, {{A1, 0, Ub}, {A2, 0, Ub}}]
{54.4656, {A1 → 27.8814, A2 → 26.5841}}

```

```

p4 = ContourPlot[A1 + A2, {A1, 0, Ub}, {A2, 0, Ub},
  ContourShading -> None, FrameLabel -> Automatic, ContourLabels -> True];
p5 = ContourPlot[A1 + A2 == 54.465558980381886`, {A1, 0, Ub},
  {A2, 0, Ub}, ContourStyle -> {Green, Thick}];
p6 = ContourPlot[{A1 == 27.88141970136996`, A2 == 26.584139279011925`},
  {A1, 0, Ub}, {A2, 0, Ub}, ContourStyle -> Blue];
Show[
  p4,
  p5,
  p6]

```



```
Ub = 40;
```

```

NMinimize[{A1 + A2, -Sh <= S1 <= Sh, -Sh <= S2 <= Sh, -Sh <= S3 <= Sh,
  -Sh <= S4 <= Sh, v[[2]] <= 0.3, A1 >= 0, A2 >= 0}, {{A1, 0, Ub}, {A2, 0, Ub}}]
{18.4807, {A1 -> 9.24033, A2 -> 9.24033}}

```

```

NMinimize[{A1 + A2, -Sh <= S1 <= Sh, -Sh <= S2 <= Sh, -Sh <= S3 <= Sh,
  -Sh <= S4 <= Sh, -SE2 / L12^2 <= S2 <= SE2 / L12^2, -SE1 / L34^2 <= S4 <= SE1 / L34^2,
  v[[2]] <= 0.3, A1 >= 0, A2 >= 0}, {{A1, 0, Ub}, {A2, 0, Ub}}]
{54.4656, {A1 -> 27.8814, A2 -> 26.5841}}

```

```

p7 = ContourPlot[A1 + A2, {A1, 0, Ub}, {A2, 0, Ub},
  ContourShading -> None, FrameLabel -> Automatic, ContourLabels -> True];
p8 = ContourPlot[A1 + A2 == 18.48065530903437`, {A1, 0, Ub},
  {A2, 0, Ub}, ContourStyle -> {Green, Thick}];
p81 = ContourPlot[A1 + A2 == 54.465558980381886`, {A1, 0, Ub},
  {A2, 0, Ub}, ContourStyle -> {Green, Thick}];
p9 = ContourPlot[{A1 == 9.240327860865705`, A2 == 9.240327870704686`},
  {A1, 0, Ub}, {A2, 0, Ub}, ContourStyle -> Blue];
p91 = ContourPlot[{A1 == 27.88141970136996`, A2 == 26.584139279011925`},
  {A1, 0, Ub}, {A2, 0, Ub}, ContourStyle -> Blue];
p10 = ContourPlot[v[[2]], {A1, 0, Ub}, {A2, 0, Ub}, ContourShading -> None,
  FrameLabel -> Automatic, ContourLabels -> True];
p11 = ContourPlot[v[[2]] == 0.3, {A1, 0, Ub}, {A2, 0, Ub},
  ContourStyle -> {Green, Thick}];
Show[p7, p8, p81, p9, p91, p10, p11]

```

