

```
Clear[P, L1, SH, Ym]
```

```
Sa = Sin[30 Degree];
```

```
Ca = Cos[30 Degree];
```

```
GT = {{-Ca, -Sa, 0, 0}, {Ca, Sa, -Ca, -Sa}, {-Ca, Sa, 0, 0}, {0, 0, -1, 0}};
```

```
G = Transpose[GT];
```

```
q = {0, P, 0, 2 P};
```

```
L2 = 2 L1 Ca;
```

```
F = DiagonalMatrix[{L1 / Ym / A1, L1 / Ym / A1, L1 / Ym / A1, L2 / Ym / A2}];
```

```
s = -Inverse[G].q
```

```
v = -Inverse[GT].F.s
```

```
{5 P, 4 P, -P, -2  $\sqrt{3}$  P}
```

```
{ $\frac{4 L1 P}{\sqrt{3} A1 Ym}$ ,  $\frac{6 L1 P}{A1 Ym}$ ,  $-\frac{6 L1 P}{A2 Ym}$ ,  $\frac{18 L1 P}{A1 Ym} + \frac{6 \sqrt{3} L1 P}{A2 Ym}$ }
```

```
Alhat = s[[1]] / SH;
```

```
A2hat = Abs[s[[4]] / SH];
```

```
uhat = SH L1 / Ym;
```

```
P = 10;
```

```
L1 = 100;
```

```
SH = 23.5;
```

```
Ym = 21 000;
```

```
NMinimize[{3 A1 + Sqrt[3] A2, A1 ≥ Alhat, A2 ≥ A2hat, v[[4]] ≤ uhat}, {A1, A2}]
```

NMinimize::incst: NMinimize was unable to generate any initial points satisfying the inequality constraints

$\{-0.111905 + \frac{6}{7 A1} + \frac{2 \sqrt{3}}{7 A2} \leq 0\}$. The initial region specified may not contain any feasible points.

Changing the initial region or specifying explicit initial points may provide a better solution. >>

```
{57.1718, {A1 → 12.0819, A2 → 12.0817}}
```

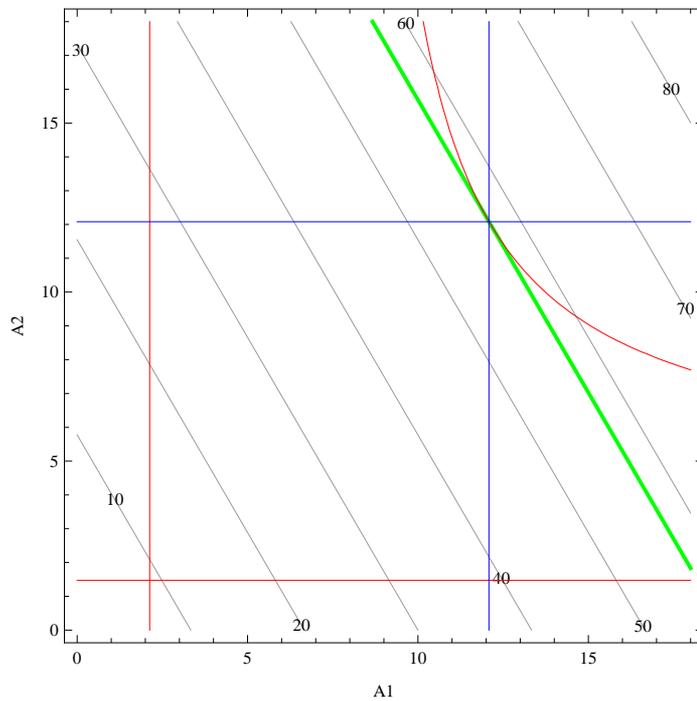
```
NMinimize[{5 / X1 + 2 / X2, {0 ≤ X1 ≤ 1, 0 ≤ X2 ≤ 1, 18 X1 / 5 + 3 X2 ≤ 1}}, {X1, X2}]
```

```
{44.7846, {X1 → 0.176104, X2 → 0.122008}}
```

```

p1 = ContourPlot[3 A1 + Sqrt[3] A2, {A1, 0, 18}, {A2, 0, 18},
  ContourShading -> None, FrameLabel -> Automatic, ContourLabels -> True];
p2 = ContourPlot[3 A1 + Sqrt[3] A2 == 57.17184209710898,
  {A1, 0, 18}, {A2, 0, 18}, ContourStyle -> {Green, Thick}];
p3 = ContourPlot[{A1 == A1hat, A2 == A2hat,  $\frac{18 L1 P}{A1 Ym} + \frac{6 \sqrt{3} L1 P}{A2 Ym} == 0.11190476190476191$ },
  {A1, 0, 18}, {A2, 0, 18}, ContourStyle -> Red];
p4 = ContourPlot[{A1 == 12.081916159229394, A2 == 12.08168578425991},
  {A1, 0, 18}, {A2, 0, 18}, ContourStyle -> Blue];
Show[p1, p2, p3, p4]

```



```

p5 = ContourPlot[5 / X1 + 2 / X2, {X1, 0, 1}, {X2, 0, 1},
  ContourShading -> None, FrameLabel -> Automatic, ContourLabels -> True];
p6 = ContourPlot[5 / X1 + 2 / X2 == 44.78461020485068, {X1, 0, 1},
  {X2, 0, 1}, ContourStyle -> {Green, Thick}];
p7 = ContourPlot[18 X1 / 5 + 3 X2 == 1, {X1, 0, 1}, {X2, 0, 1}, ContourStyle -> Red];
p8 = ContourPlot[{X1 == 0.1761040521299526, X2 == 0.12200846695149145},
  {X1, 0, 1}, {X2, 0, 1}, ContourStyle -> Blue];
Show[
  p5,
  p6,
  p7,
  p8]

```

