

```
>> app(7);
```

```
Local minimum found that satisfies the constraints.
```

```
Optimization completed because the objective function is non-decreasing in  
feasible directions, to within the default value of the optimality tolerance,  
and constraints are satisfied to within the default value of the constraint tolerance.
```

```
<stopping criteria details>
```

```
x1 =
```

```
30.2104 75.5259
```

```
fval1 =
```

```
278.6738
```

```
exitflag1 =
```

```
1
```

```
output1 =
```

```
struct with fields:
```

```
iterations: 4
```

```
funcCount: 15
```

```
algorithm: 'sqp'
```

```
message: 'Local minimum found that satisfies the constraints.'
```

```
Optimization completed because the objective function is non-decreasing in  
feasible directions, to within the default value of the optimality tolerance,  
and constraints are satisfied to within the default value of the constraint tolerance.  
Stopping criteria details: Optimization completed: The relative first-order  
optimality measure, 2.800788e-08, is less than options.OptimalityTolerance = 1.000000e-06,  
and the relative maximum constraint violation, 0.000000e+00, is less than  
options.ConstraintTolerance = 1.000000e-06. Optimization Metric  
Options relative first-order optimality = 2.80e-08 OptimalityTolerance =  
1e-06 (default) relative max(constraint violation) = 0.00e+00  
ConstraintTolerance = 1e-06 (default)'
```

```
constrviolation: 0
```

```
stepsize: 2.4795e-06
```

```
lssteplength: 1
```

```
firstorderopt: 8.9412e-08
```

```
Local minimum found that satisfies the constraints.
```

```
Optimization completed because the objective function is non-decreasing in  
feasible directions, to within the default value of the optimality tolerance,  
and constraints are satisfied to within the default value of the constraint tolerance.
```

<stopping criteria details>

x2 =

30.2104 75.5259

fval2 =

278.6738

exitflag2 =

1

output2 =

struct with fields:

iterations: 7  
funcCount: 25  
constrviolation: 0  
stepsize: 9.1150e-05  
algorithm: 'interior-point'  
firstorderopt: 2.0028e-06  
cgiterations: 0

message: 'Local minimum found that satisfies the constraints.'

Optimization completed because the objective function is non-decreasing in  
feasible directions, to within the default value of the optimality tolerance, and  
constraints are satisfied to within the default value of the constraint tolerance.  
Stopping criteria details: Optimization completed: The relative first-order  
optimality measure, 6.273567e-07, is less than options.OptimalityTolerance = 1.000000e-06,  
and the relative maximum constraint violation, 0.000000e+00, is less than  
options.ConstraintTolerance = 1.000000e-06. Optimization Metric  
Options relative first-order optimality = 6.27e-07 OptimalityTolerance =  
1e-06 (default) relative max(constraint violation) = 0.00e+00  
ConstraintTolerance = 1e-06 (default)'

Active inequalities (to within options.ConstraintTolerance = 1e-06):

lower	upper	ineqlin	ineqnonlin
			5
			8

Local minimum possible. Constraints satisfied.

fmincon stopped because the size of the current search direction is less than  
twice the default value of the step size tolerance and constraints are  
satisfied to within the default value of the constraint tolerance.

<stopping criteria details>

x3 =

30.2104    75.5259

fval3 =

278.6738

exitflag3 =

4

output3 =

struct with fields:

iterations: 5  
funcCount: 15  
lssteplength: 1  
stepsize: 1.0821e-06  
algorithm: 'active-set'  
firstorderopt: 2.5174e-06  
constrviolation: -4.1261e-11

message: 'Local minimum possible. Constraints satisfied. fmincon stopped because the size of the current search direction is less than twice the default value of the step size tolerance and constraints are satisfied to within the default value of the constraint tolerance. Stopping criteria details: Optimization stopped because the norm of the current search direction, 1.004675e-06, is less than 2\*options.StepTolerance = 1.000000e-06, and the maximum constraint violation, -4.126122e-11, is less than options.ConstraintTolerance = 1.000000e-06. Optimization Metric Options norm(search direction) = 1.00e-06 StepTolerance = 1e-06 (default) max(constraint violation) = -4.13e-11 ConstraintTolerance = 1e-06 (default)'

>>