

Convex Optimization

Tutorial 8

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In [ ]: #Importing required Libraries
import numpy as np
import matplotlib.pyplot as plt
import cvxpy as cp
import math
```

```
In [ ]: n = 100
d = 1
D1 = 0.08
D2 = 0.025
D3 = 0.005
```

```
In [ ]: h = cp.Variable(n)
e = 5 * np.sin(np.linspace(1,100,100, endpoint=True) * 3 * np.pi/100) + np.sin(np.linspace(1, 100, 100, endpoint=True) * np.pi*10)
u = h - e
```

```
In [ ]: phi_fill = 2 * cp.power(cp.pos(u),2) + 30 * cp.pos(u)
phi_cut = 12 * cp.power(cp.neg(u),2) + cp.neg(u)

MyObjective = cp.Minimize(cp.sum(phi_cut + phi_fill))
```

```
In [ ]: MyConstraints = [
    cp.abs(cp.diff(h, 1)) <= D1,
    cp.abs(cp.diff(h, 2)) <= D2,
    cp.abs(cp.diff(h, 3)) <= D3
]
```

```
In [ ]: MyProblem = cp.Problem(MyObjective, MyConstraints)
value = MyProblem.solve(solver='ECOS')
print(value)
```

7562.815571967377

```
In [ ]: plt.figure()
plt.plot(np.linspace(1,100,100, endpoint=True), h.value)
plt.plot(np.linspace(1,100,100, endpoint=True), e)
```

Out[]: [<matplotlib.lines.Line2D at 0x298ecccae0>]

