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In [ ]: import numpy as np
import matplotlib.pyplot as plt
import UPAFuzzySystems as UPAfs
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In [ ]: OilPrice = UPAfs.fuzzy_universe('Oil Price',np.linspace(5,30,50),'discrete')
OilPrice.add_fuzzyset('Low','trapmf',[5,5,10,14])
OilPrice.add_fuzzyset('Good','trimf',[10,15,22])
OilPrice.add_fuzzyset('High','trapmf',[16,22,30,30])
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OilPrice.structure
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Out[ ]: {'name': 'Oil Price',
'universe': array([ 5.          ,  5.51020408,  6.02040816,  6.53061224,  7.04081633,
 7.55102041,  8.06122449,  8.57142857,  9.08163265,  9.59183673,
10.10204082, 10.6122449 , 11.12244898, 11.63265306, 12.14285714,
12.65306122, 13.16326531, 13.67346939, 14.18367347, 14.69387755,
15.20408163, 15.71428571, 16.2244898 , 16.73469388, 17.24489796,
17.75510204, 18.26530612, 18.7755102 , 19.28571429, 19.79591837,
20.30612245, 20.81632653, 21.32653061, 21.83673469, 22.34693878,
22.85714286, 23.36734694, 23.87755102, 24.3877551 , 24.89795918,
25.40816327, 25.91836735, 26.42857143, 26.93877551, 27.44897959,
27.95918367, 28.46938776, 28.97959184, 29.48979592, 30.          ]),
'Low': ['trapmf', [5, 5, 10, 14]],
'Good': ['trimf', [10, 15, 22]],
'High': ['trapmf', [16, 22, 30, 30]]}
```

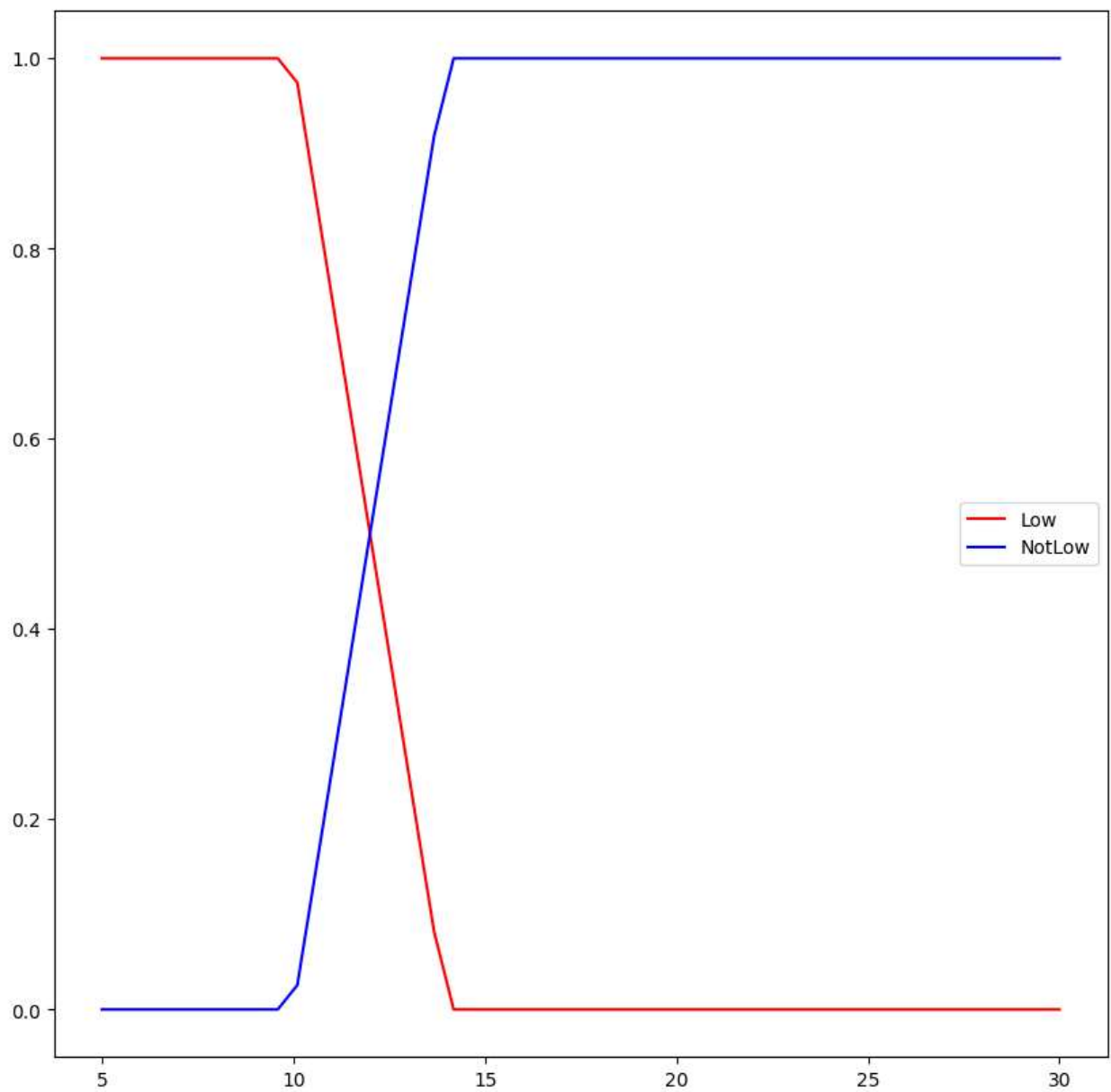
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In [ ]: X = OilPrice.structure['universe']
vertsLow = OilPrice.structure['Low'][1]
membLow = UPAfs.trapmf(X,vertsLow)
vertsGood = OilPrice.structure['Good'][1]

membGood = UPAfs.trimf(X,vertsGood)

Low = {'Universe':X,'Membership Values':membLow}
NotLow = {'Universe':X,'Membership Values':1-membLow}
Good = {'Universe':X,'Membership Values':membGood}

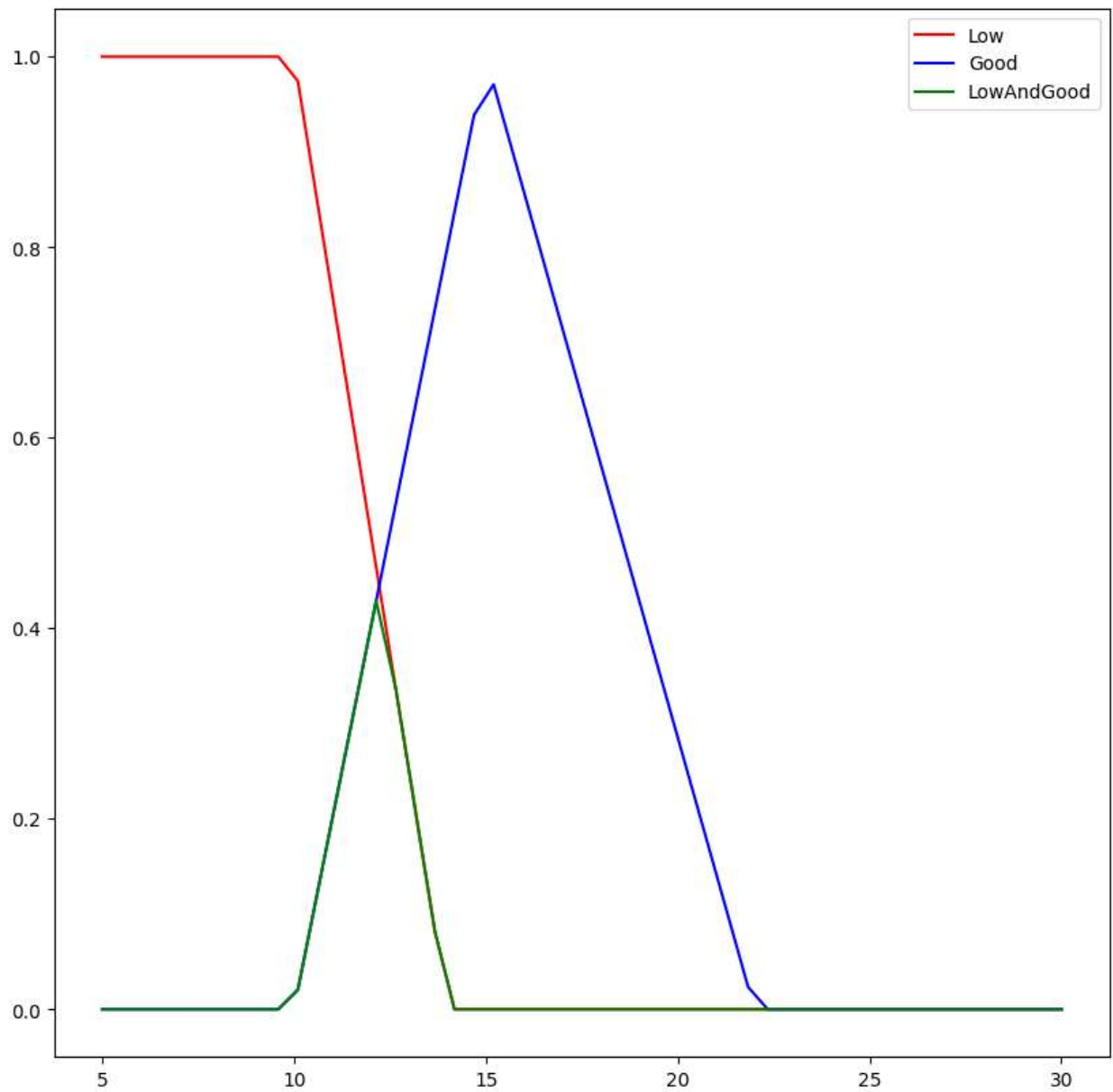
LowAndGood = {'Universe':X,'Membership Values':np.minimum(membLow,membGood)}
```

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In [ ]: fig1 = plt.figure(figsize = (10,10))
ax1 = fig1.add_subplot(111)
ax1.plot(Low['Universe'],Low['Membership Values'],'r',label = 'Low')
ax1.plot(NotLow['Universe'],NotLow['Membership Values'],'b',label = 'NotLow')
plt.legend()
plt.show()
```



```
In [ ]: fig1 = plt.figure(figsize = (10,10))
ax1 = fig1.add_subplot(111)
ax1.plot(Low['Universe'],Low['Membership Values'],'r',label = 'Low')
ax1.plot(Good['Universe'],Good['Membership Values'],'b',label = 'Good')
ax1.plot(LowAndGood['Universe'],LowAndGood['Membership Values'],'g',label = 'LowAndGood')

plt.legend()
plt.show()
```



```
In [ ]: %matplotlib inline
fig1 = plt.figure(figsize = (10,10))
ax1 = fig1.add_subplot(111)
ax1.plot(Low['Universe'],Low['Membership Values'],'r',label = 'Low')
ax1.plot(Low['Universe'],Low['Membership Values']**2,'b',label = 'VeryLow')
ax1.plot(Low['Universe'],Low['Membership Values']**3,'g',label = 'ExtremelyLow')
ax1.plot(Low['Universe'],Low['Membership Values']**(1/2),'m',label = 'MoreLessLow')
ax1.plot(Low['Universe'],Low['Membership Values']**(1/3),'y',label = 'SlightlyLow')
plt.legend()
plt.show()
```

