

Untitled

November 4, 2020

```
[1]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

x=np.arange(0,11,1)

calidad=sk.trimf(x, [0,0,0])

plt.figure()
plt.plot(x, calidad, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
↳ fancybox=True, shadow=True)
```

```
[1]: <matplotlib.legend.Legend at 0x1c234be1248>
```



```
[2]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

x=np.arange(0,11,1)

calidad=sk.trimf(x, [0,0,5])

plt.figure()
plt.plot(x, calidad, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
→fancybox=True, shadow=True)
```

[2]: <matplotlib.legend.Legend at 0x1c236cee888>



```
[3]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt
```

```

x=np.arange(0,11,1)

calidad=sk.trimf(x, [0,5,10])

plt.figure()
plt.plot(x, calidad, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
→fancybox=True, shadow=True)

```

[3]: <matplotlib.legend.Legend at 0x1c236d6d408>



```

[4]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

x=np.arange(0,11,1)

calidad=sk.trimf(x, [9,9,10])

plt.figure()
plt.plot(x, calidad, 'b', linewidth=1.5, label='servicio')

```

```
plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
→fancybox=True, shadow=True)
```

[4]: <matplotlib.legend.Legend at 0x1c236ddf3c8>



```
[5]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

x=np.arange(0,11,1)

calidad=sk.trimf(x, [10,10,10])

plt.figure()
plt.plot(x, calidad, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
→fancybox=True, shadow=True)
```

[5]: <matplotlib.legend.Legend at 0x1c236e55448>



```
[8]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

x=np.arange(0,11,1)

vd_trapezoidal=sk.trapmf(x, [0,0,5,5])

plt.figure()
plt.plot(x, vd_trapezoidal, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
↳fancybox=True, shadow=True)
```

[8]: <matplotlib.legend.Legend at 0x1c2370015c8>



```
[9]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

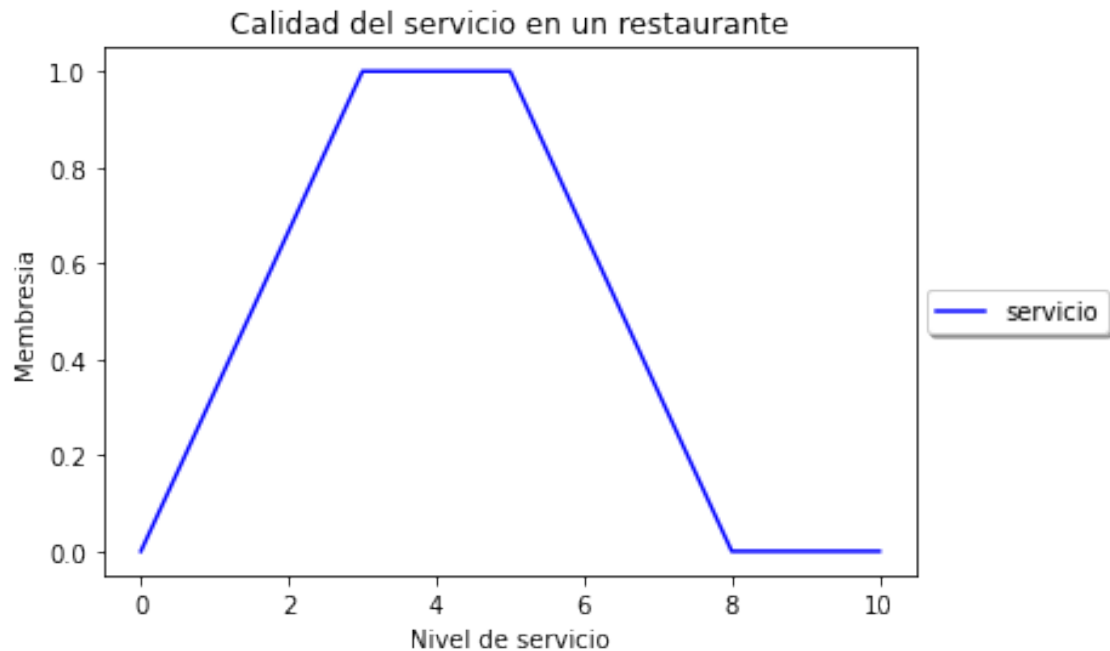
x=np.arange(0,11,1)

vd_trapezoidal=sk.trapmf(x, [0,3,5,8])

plt.figure()
plt.plot(x, vd_trapezoidal, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
↳fancybox=True, shadow=True)
```

[9]: <matplotlib.legend.Legend at 0x1c236e0ec08>



```
[11]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

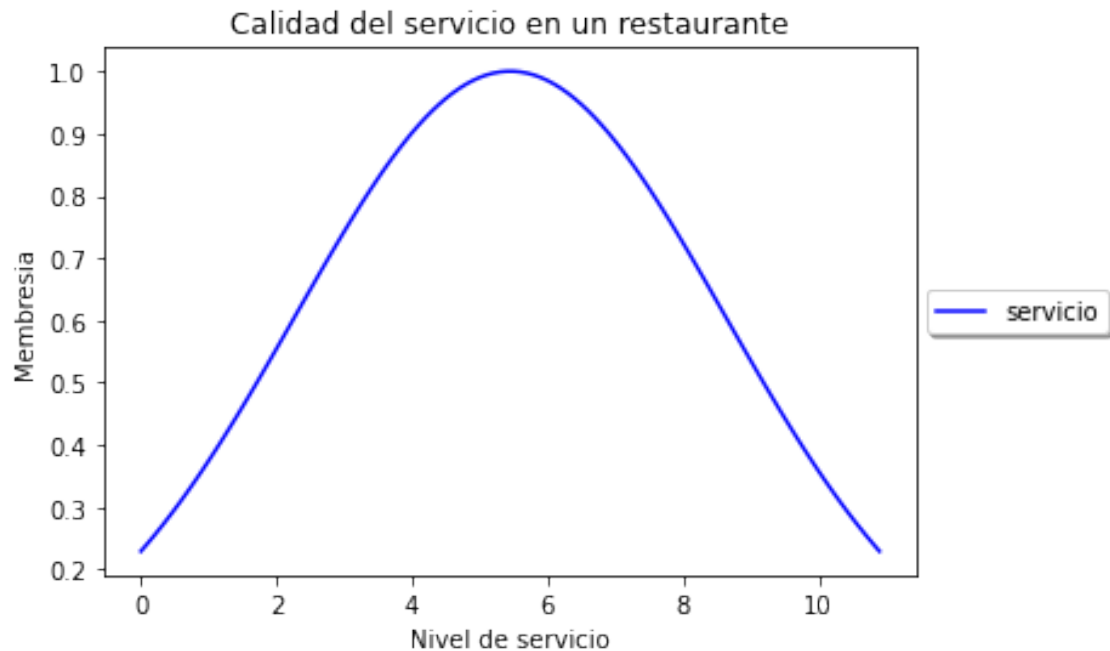
x=np.arange(0,11,0.1)

vd_gaussiana=sk.gaussmf(x, np.mean(x), np.std(x))

plt.figure()
plt.plot(x, vd_gaussiana, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
→fancybox=True, shadow=True)
```

```
[11]: <matplotlib.legend.Legend at 0x1c238111388>
```



```
[12]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

x=np.arange(0,11,0.6)

vd_bell=sk.gbellmf(x, 2, 3, 5)

plt.figure()
plt.plot(x, vd_bell, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
→fancybox=True, shadow=True)
```

```
[12]: <matplotlib.legend.Legend at 0x1c23818b088>
```




```
[13]: import numpy as np
import skfuzzy as sk
import matplotlib.pyplot as plt

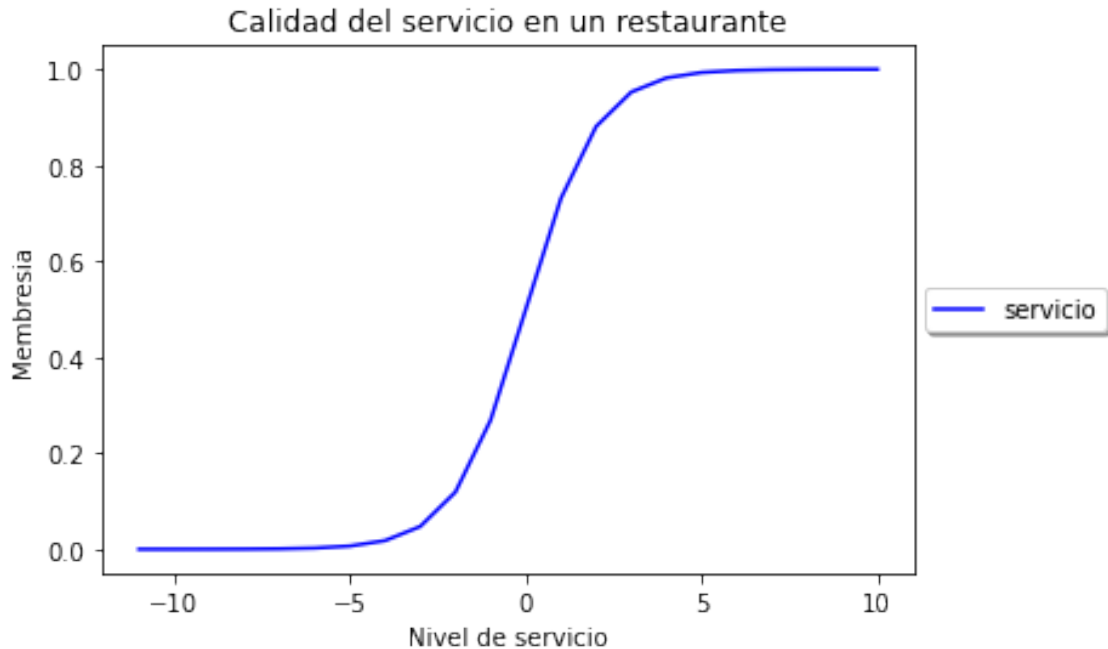
x=np.arange(-11,11,1)

vd_sigmoide=sk.sigmf(x, 0, 1)

plt.figure()
plt.plot(x, vd_sigmoide, 'b', linewidth=1.5, label='servicio')

plt.title('Calidad del servicio en un restaurante')
plt.ylabel('Membresia')
plt.xlabel('Nivel de servicio')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
↳fancybox=True, shadow=True)
```

[13]: <matplotlib.legend.Legend at 0x1c2381f3748>



```
[18]: import numpy as np
import skfuzzy as fuzz
import matplotlib.pyplot as plt
%matplotlib inline

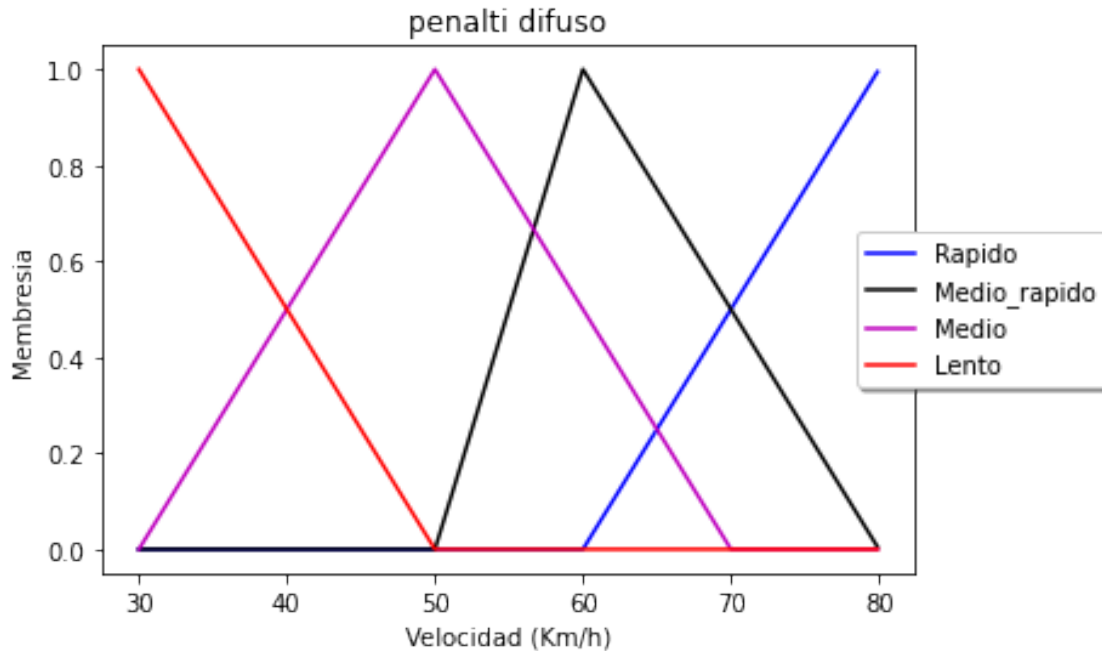
x=np.arange(30,80,0.1)

lento=fuzz.trimf(x, [30,30,50])
medio=fuzz.trimf(x, [30,50,70])
medio_rapido=fuzz.trimf(x, [50,60,80])
rapido= fuzz.trimf(x, [60,80,80])

plt.figure()
plt.plot(x, rapido, 'b', linewidth=1.5, label='Rapido')
plt.plot(x, medio_rapido, 'k', linewidth=1.5, label='Medio_rapido')
plt.plot(x, medio, 'm', linewidth=1.5, label='Medio')
plt.plot(x, lento, 'r', linewidth=1.5, label='Lento')

plt.title('penalti difuso')
plt.ylabel('Membresia')
plt.xlabel('Velocidad (Km/h)')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
↪ fancybox=True, shadow=True)
```

[18]: <matplotlib.legend.Legend at 0x1c2381d3bc8>



```
[21]: import numpy as np
import skfuzzy as fuzz
import matplotlib.pyplot as plt
%matplotlib inline

x=np.arange(0,11,1)

bajo=fuzz.trimf(x, [0,0,5])
medio=fuzz.trimf(x, [0,5,10])

plt.figure()
plt.plot(x, bajo, 'b', linewidth=1.5, label='Bajo')
plt.plot(x, medio, 'r', linewidth=1.5, label='Medio')

plt.title('Funcion Union(maximo)')
plt.ylabel('Membresia')
plt.xlabel('Velocidad (Km/h)')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
→fancybox=True, shadow=True)

plt.axvline(x=0, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=1, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=2, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=3, ymin=0, ymax=10, color="g", linestyle='-.')
```

```

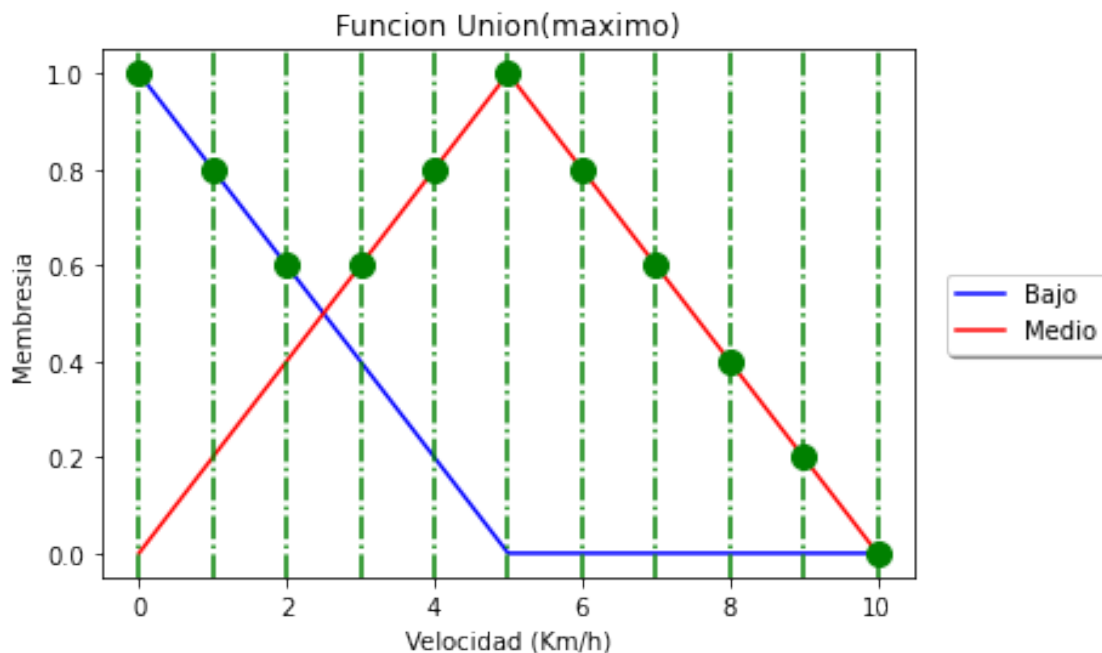
plt.axvline(x=4, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=5, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=6, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=7, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=8, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=9, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=10, ymin=0, ymax=10, color="g", linestyle='-.')

plt.plot(0, 1, marker='o', markersize=10, color='g')
plt.plot(1, 0.8, marker='o', markersize=10, color='g')
plt.plot(2, 0.6, marker='o', markersize=10, color='g')
plt.plot(3, 0.6, marker='o', markersize=10, color='g')
plt.plot(4, 0.8, marker='o', markersize=10, color='g')
plt.plot(5, 1, marker='o', markersize=10, color='g')
plt.plot(6, 0.8, marker='o', markersize=10, color='g')
plt.plot(7, 0.6, marker='o', markersize=10, color='g')
plt.plot(8, 0.4, marker='o', markersize=10, color='g')
plt.plot(9, 0.2, marker='o', markersize=10, color='g')
plt.plot(10, 0, marker='o', markersize=10, color='g')

plt.show()

sk.fuzzy_or(x, bajo, x, medio)

```



```
[21]: (array([ 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]),
      array([1. , 0.8, 0.6, 0.6, 0.8, 1. , 0.8, 0.6, 0.4, 0.2, 0. ]))
```

```
[22]: import numpy as np
import skfuzzy as fuzz
import matplotlib.pyplot as plt
%matplotlib inline

x=np.arange(0,11,1)

bajo=fuzz.trimf(x, [0,0,5])
medio=fuzz.trimf(x, [0,5,10])

plt.figure()
plt.plot(x, bajo, 'b', linewidth=1.5, label='Bajo')
plt.plot(x, medio, 'r', linewidth=1.5, label='Medio')

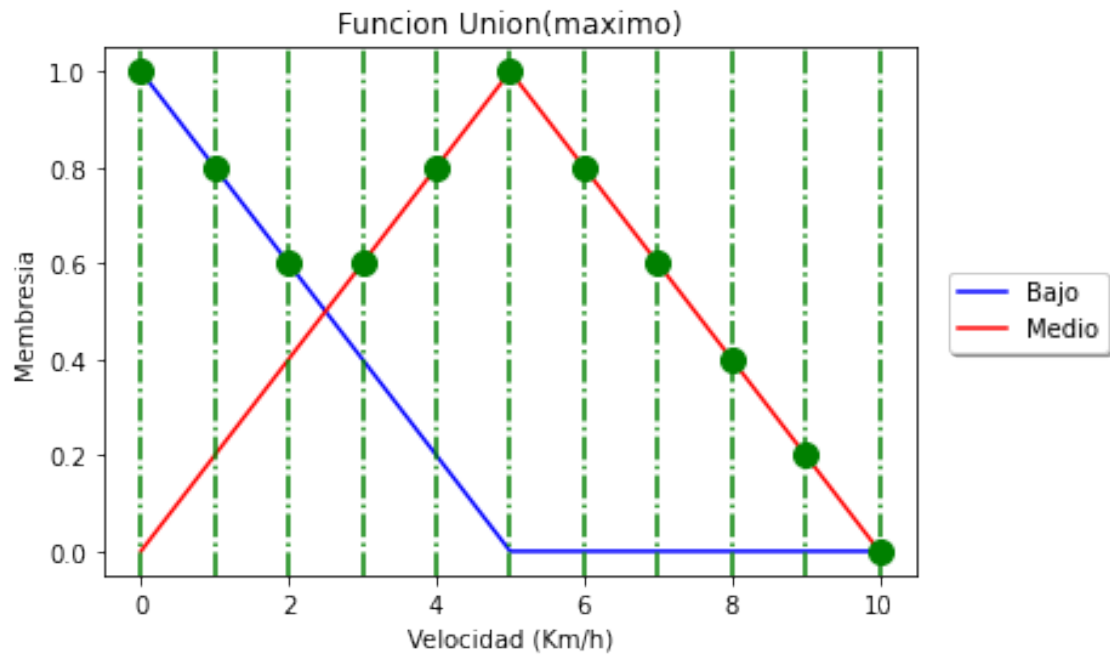
plt.title('Funcion Union(maximo)')
plt.ylabel('Membresia')
plt.xlabel('Velocidad (Km/h)')
plt.legend(loc='center right', bbox_to_anchor=(1.25, 0.5), ncol=1,
↳ fancybox=True, shadow=True)

plt.axvline(x=0, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=1, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=2, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=3, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=4, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=5, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=6, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=7, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=8, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=9, ymin=0, ymax=10, color="g", linestyle='-.')
plt.axvline(x=10, ymin=0, ymax=10, color="g", linestyle='-.')

plt.plot(0, 1, marker='o', markersize=10, color='g')
plt.plot(1, 0.8, marker='o', markersize=10, color='g')
plt.plot(2, 0.6, marker='o', markersize=10, color='g')
plt.plot(3, 0.6, marker='o', markersize=10, color='g')
plt.plot(4, 0.8, marker='o', markersize=10, color='g')
plt.plot(5, 1, marker='o', markersize=10, color='g')
plt.plot(6, 0.8, marker='o', markersize=10, color='g')
plt.plot(7, 0.6, marker='o', markersize=10, color='g')
plt.plot(8, 0.4, marker='o', markersize=10, color='g')
plt.plot(9, 0.2, marker='o', markersize=10, color='g')
plt.plot(10, 0, marker='o', markersize=10, color='g')
```

```
plt.show()
```

```
sk.fuzzy_and(x, bajo, x, medio)
```



```
[22]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10]),  
       array([0. , 0.2, 0.4, 0.4, 0.2, 0. , 0. , 0. , 0. , 0. , 0. ]))
```

```
[ ]:
```