In [1]:

```
import pandas as pd
import numpy as np
from Develop.EMD2D import EMD2D
import cv2
from sklearn.preprocessing import minmax_scale
from sklearn.neighbors import KNeighborsClassifier, KNeighborsRegressor
from sklearn.tree import DecisionTreeClassifier, DecisionTreeRegressor
from sklearn.ensemble import RandomForestClassifier, AdaBoostClassifier
from sklearn.linear_model import LogisticRegression, LinearRegression
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
%matplotlib inline
```

In [2]:

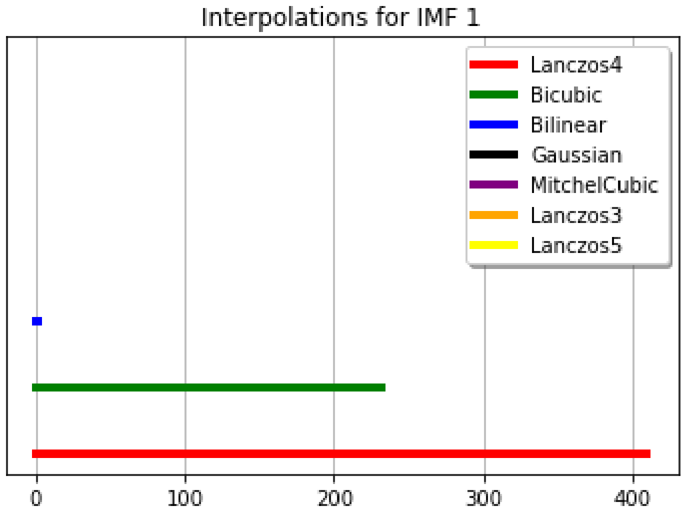
```
df = pd.read_csv('Interpolations.csv')
df = df.drop(columns=['Channels'])
df = df.apply(lambda x: x.astype('category') if x.dtype=='object' else
x)
to_work = df.copy()
interpolations = to_work['Interpolation Method'].unique().astype(str)
colors = ['r', 'g', 'b', 'black', 'purple', 'orange', 'yellow']
```

IMF Counter Plotting

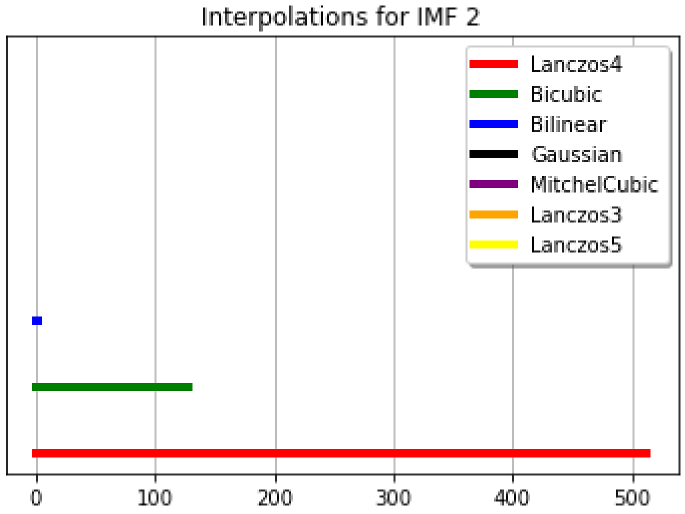
In [4]:

```
def imf_plot(imf: int):
    temp = to_work[to_work['IMF Spot'] == 'IMF ' + str(imf)]
    counts = np.array([])
    for i in range(len(interpolations)):
        x1 = temp[temp['Interpolation Method'] == interpolations[i]].co
unt()[0]
        x1 = np.linspace(0, x1, 2)
        y = np.repeat((i + 1) * 6, 2)
        counts = np.append(counts, plt.plot(x1, y, colors[i], linewidth
 = 4))
```

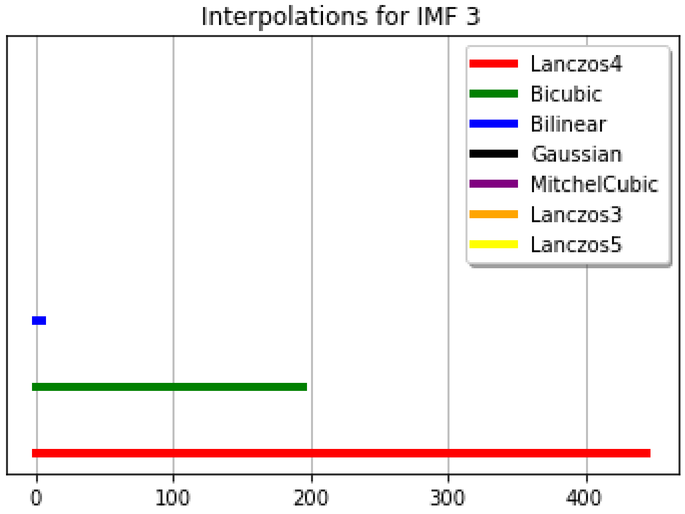
```
    plt.title('Interpolations for IMF ' + str(imf))
    plt.grid()
    plt.yticks([])
    plt.legend(counts, interpolations, fancybox=True, shadow=True, fram
ealpha=1)
imf_plot(1)
```



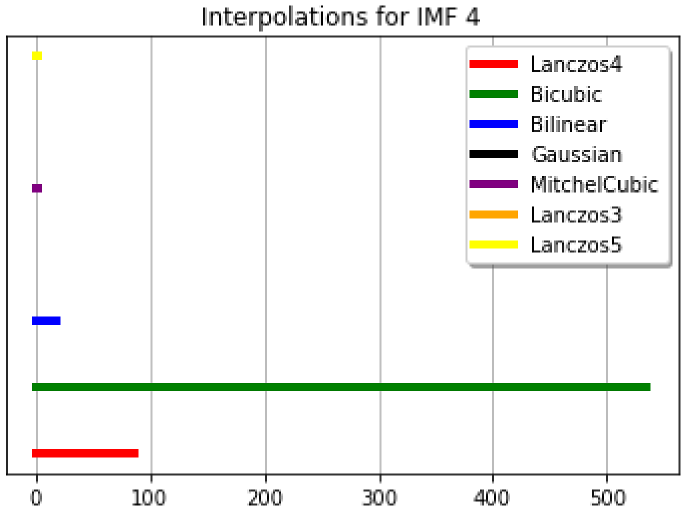
In [5]:
```
imf_plot(2)
```



In [6]:
```
imf_plot(3)
```

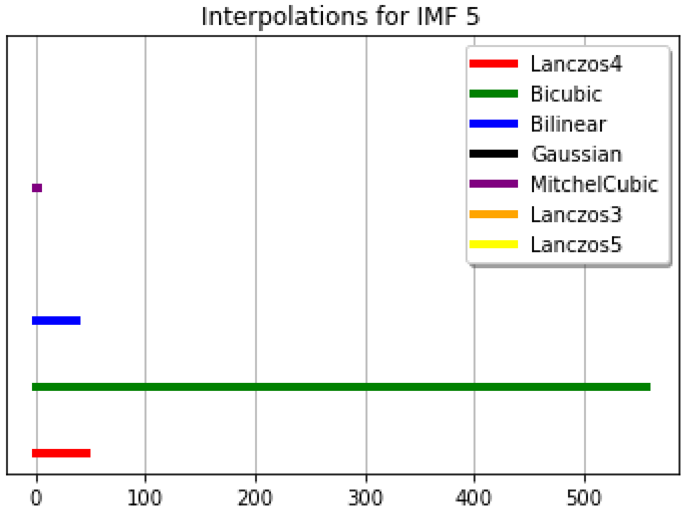


In [7]:
```
imf_plot(4)
```



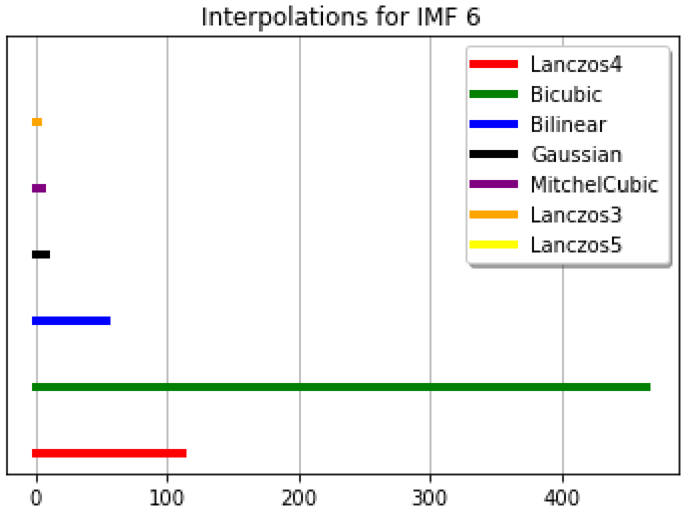
In [8]:

```
imf_plot(5)
```

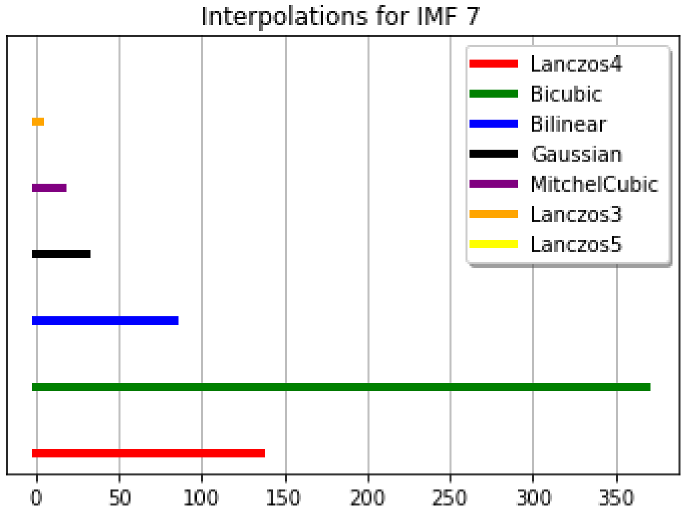


In [9]:

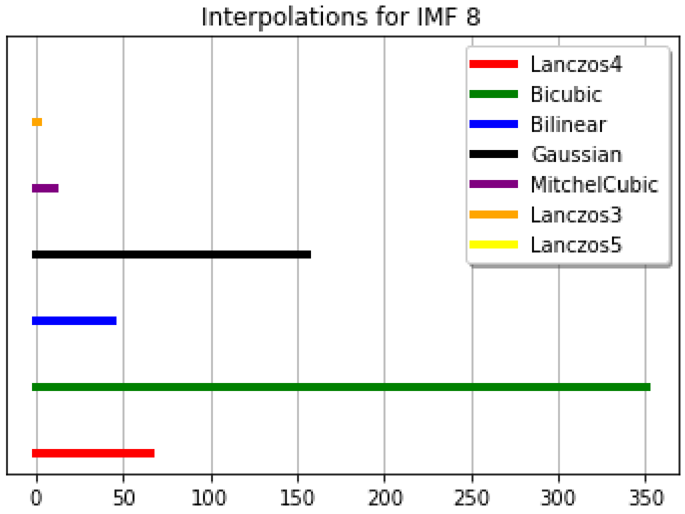
```
imf_plot(6)
```



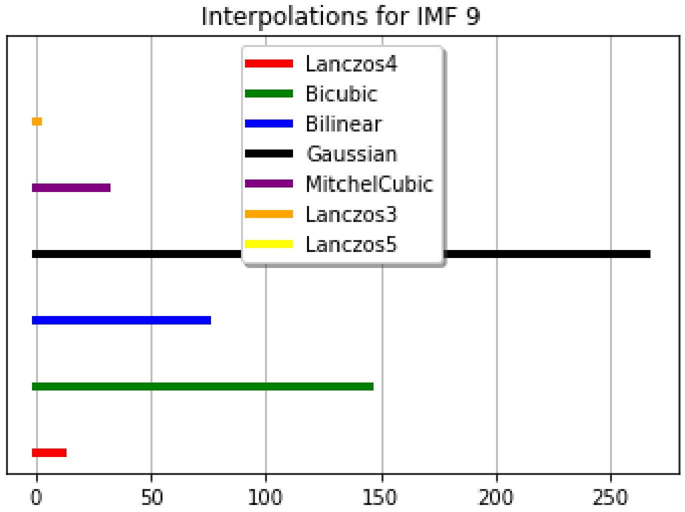
```
In [10]: imf_plot(7)
```



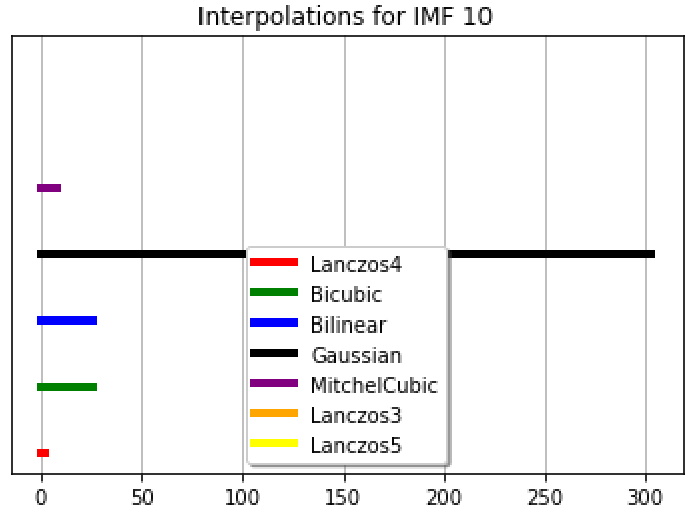
```
In [11]: imf_plot(8)
```



In [12]:
```
imf_plot(9)
```

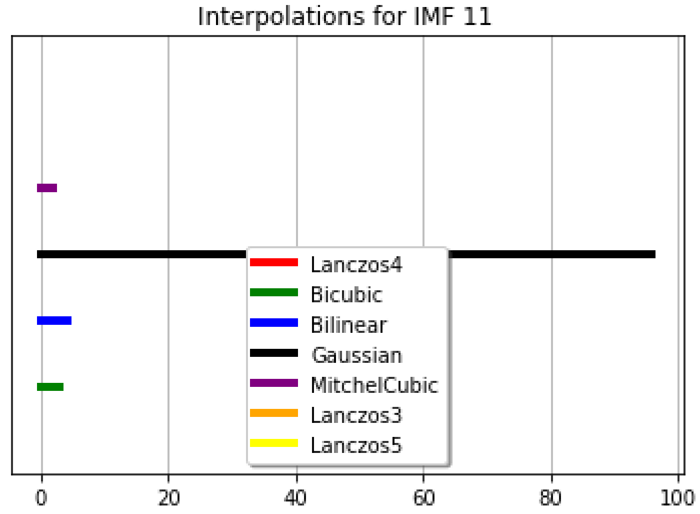


In [13]:
```
imf_plot(10)
```



In [14]:

```
imf_plot(11)
```



In [15]:

```
to_work['IMF Spot'] = to_work['IMF Spot'].cat.codes
to_work['File Name'] = to_work['File Name'].cat.codes
to_work['Interpolation Method'] = to_work['Interpolation Method'].cat.c
odes
```

Defining Models + Train-Test Splitting

In [17]:
```
target = to_work['Interpolation Method']
to_work = to_work.drop(columns='Interpolation Method')

#to_work = minmax_scale(to_work)
#target = minmax_scale(target)
```

In [18]:
```
x_train, x_test, y_train, y_test = train_test_split(to_work, target)
```

In [19]:
```
random_forest = RandomForestClassifier()
random_forest.fit(x_train, y_train)
```

Out[19]:
```
RandomForestClassifier()
```

In [20]:
```
knn = KNeighborsClassifier()
knn.fit(x_train, y_train)
```

Out[20]:
```
KNeighborsClassifier()
```

In [21]:
```
desicion_tree = DecisionTreeClassifier()
desicion_tree.fit(x_train, y_train)
```

Out[21]:
```
DecisionTreeClassifier()
```

In [22]:
```
ada_boost = AdaBoostClassifier()
ada_boost.fit(x_train, y_train)
```

Out[22]:
```
AdaBoostClassifier()
```

In [23]:
```
log_reg = LogisticRegression()
log_reg.fit(x_train, y_train)
```

Out[23]:
```
LogisticRegression()
```

In [ ]:

In [ ]:

In [30]:

In [30]:

In [30]:

In [28]:

In [28]:

In [28]:

In [28]:

In [28]: