Lista 3: Centralidade

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1) A média da medida eigenvector centrality da rede USairport500 é igual a quanto? Considere apenas o maior componente.

```python
In [2]: import networkx as nx
        from numpy import *
        import numpy as np
        np.random.seed(100)
        import matplotlib.pyplot as plt
        import pandas as pd
        from scipy import stats
```

```python
In [5]: def read_grafo(endereco):
            G = nx.read_edgelist(endereco, nodetype = int, data = (('weig
        ht', float),))
            G = G.to_undirected()
            G.remove_edges_from(nx.selfloop_edges(G))
            Gcc = sorted(nx.connected_components(G), key = len, reverse =
        True)
            G = G.subgraph(Gcc[0])
            G = nx.convert_node_labels_to_integers(G, first_label = 0)
            return G

        G = read_grafo('ex_2/data/USairport500.txt')

        EC = dict(nx.eigenvector_centrality(G, max_iter = 1000))
        # print('Eigenvetor centrality: ', EC)
        EC = list(EC.values())
        # print(EC)
        av_EC = np.mean(EC)
        print('Average eigenvector centrality', av_EC)
```

Average eigenvector centrality 0.022754398239423695

2) Calcule a correlação de Pearson entre a medida betweeness centrality e grau para a rede hamsterster.

```
In [32]: G = read_grafo('ex_2/data/hamsterster.txt')
         B = dict(nx.betweenness_centrality(G))
         Bv = list(B.values())
         d = dict(G.degree())
         dv = list(d.values())

         pearson=np.corrcoef(Bv , dv)[0,1]
         print(f'Pearson correlation: {pearson}')
```

Pearson correlation: 0.8242435188731515

3) Calcule o coeficiente de correlação de Spearman entre as medidas closeness centrality e k-core para a rede "Jazz".

```
In [8]: G = read_grafo('ex_2/data/jazz.txt')
```

```
In [11]: clc = np.array(list(dict(nx.closeness_centrality(G)).values()))
         kc = np.array(list(dict(nx.core_number(G)).values()))


         s = stats.spearmanr(clc, kc)
         s
```

Out[11]: SpearmanrResult(correlation=0.7353399833516918, pvalue=5.88940327
         9320568e-35)