

analysis-pca-autoencoder

May 22, 2020

```
[1]: import os
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from pygmo import *
from mpl_toolkits.mplot3d import Axes3D
import methods_updated as mt
%matplotlib inline
```

1 Instância r050n12tw10k4

1.1 MOEAD-PCA

```
[2]: file = 'moead-original-pareto-execution-'
instance = 'r050n12tw10k4'
algorithm_folder_1 = 'MOEAD_PCA'
algorithm_name_1 = 'MOEAD-PCA'
hv_moead_pca_r050, hv_moead_pca_r050_df = mt.plot_hypervolume_convergence(
    os.path.join(algorithm_folder_1, instance),
    file,
    8,
    plot=False)
```

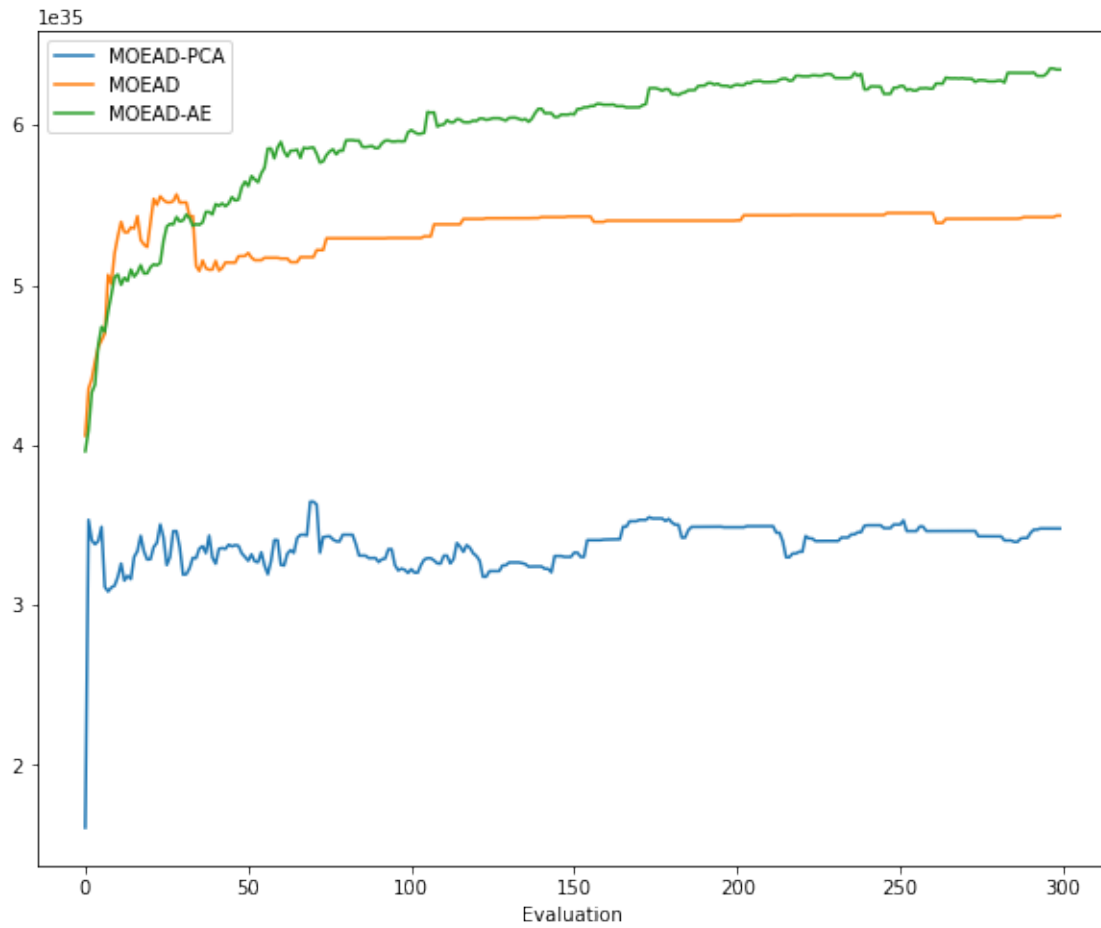
1.2 MOEAD

```
[3]: file = 'moead-original-pareto-execution-'
instance = 'r050n12tw10k4'
algorithm_folder_2 = 'MOEAD'
algorithm_name_2 = 'MOEAD'
hv_moead_r050, hv_moead_r050_df = mt.plot_hypervolume_convergence(
    os.path.join(algorithm_folder_2, instance),
    file,
    8,
    plot=False)
```

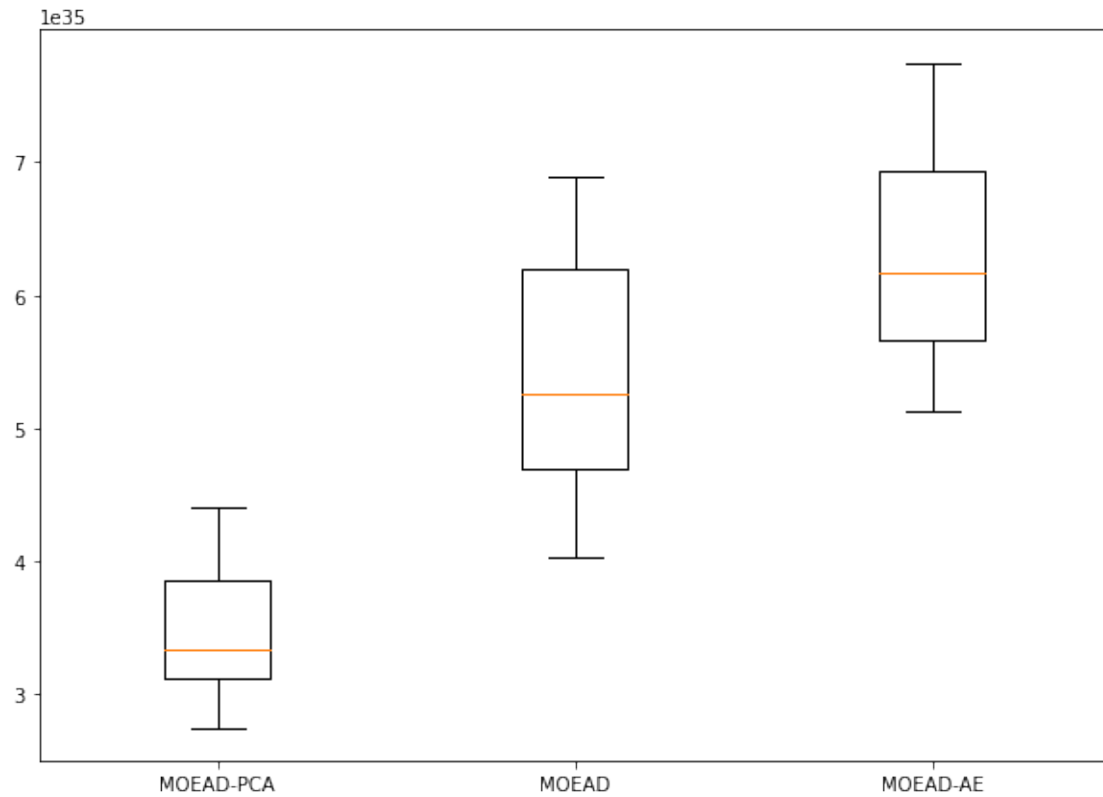
1.3 MOEAD-AE

```
[6]: file = 'moead-original-pareto-execution-'  
instance = 'r050n12tw10k4'  
algorithm_folder_3 = 'MOEAD_AE'  
algorithm_name_3 = 'MOEAD-AE'  
hv_moead_ae_r050, hv_moead_ae_r050_df = mt.plot_hypervolume_convergence(  
    os.path.join(algorithm_folder_3, instance),  
    file,  
    8,  
    plot=False)
```

```
[7]: hv_moead_pca_r050[0] = 1.6081469550308707e+35  
  
plt.figure(figsize=(10,8))  
plt.plot(hv_moead_pca_r050, label=algorithm_name_1)  
plt.plot(hv_moead_r050, label=algorithm_name_2)  
plt.plot(hv_moead_ae_r050, label=algorithm_name_3)  
plt.xlabel('Evaluation')  
plt.legend()  
plt.show()
```



```
[8]: data_to_plot = [hv_moead_pca_r050_df.iloc[299:].values.tolist()[0],
                    hv_moead_r050_df.iloc[299:].values.tolist()[0],
                    hv_moead_ae_r050_df.iloc[299:].values.tolist()[0]
                    ]
plt.figure(figsize=(10, 7))
plt.boxplot(data_to_plot, labels=[algorithm_name_1,
                                algorithm_name_2,
                                algorithm_name_3
                                ])
plt.show()
```



```
[9]: mt.random_test(hv_moead_pca_r050_df.iloc[299:], hv_moead_r050_df.iloc[299:], 10, False)
```

```
H1+
Limiar = 6.523693077475372e+34
z = 5.891266277372167
Mean Spread Diff 1.9559069789361788e+35
```

```
[10]: mt.random_test(hv_moead_ae_r050_df.iloc[299:], hv_moead_r050_df.iloc[299:], 10, False)
```

```
H0
Limiar = 1.0880332969887105e+35
z = -1.6736611411694757
Mean Spread Diff -9.134238607511934e+34
```

2 Instância r100n12tw10k4

2.1 MOEAD-PCA

```
[45]: reference_point = [350000,150000,150000,150000,150000,150000,150000,1]
file = 'moead-original-pareto-execution-'
instance = 'r100n12tw10k4'
algorithm_folder_1 = 'MOEAD_PCA'
algorithm_name_1 = 'MOEAD-PCA'
hv_moead_pca_r100, hv_moead_pca_r100_df = mt.plot_hypervolume_convergence(
    os.path.join(algorithm_folder_1, instance),
    file,
    8,
    reference_point=reference_point,
    plot=False)
```

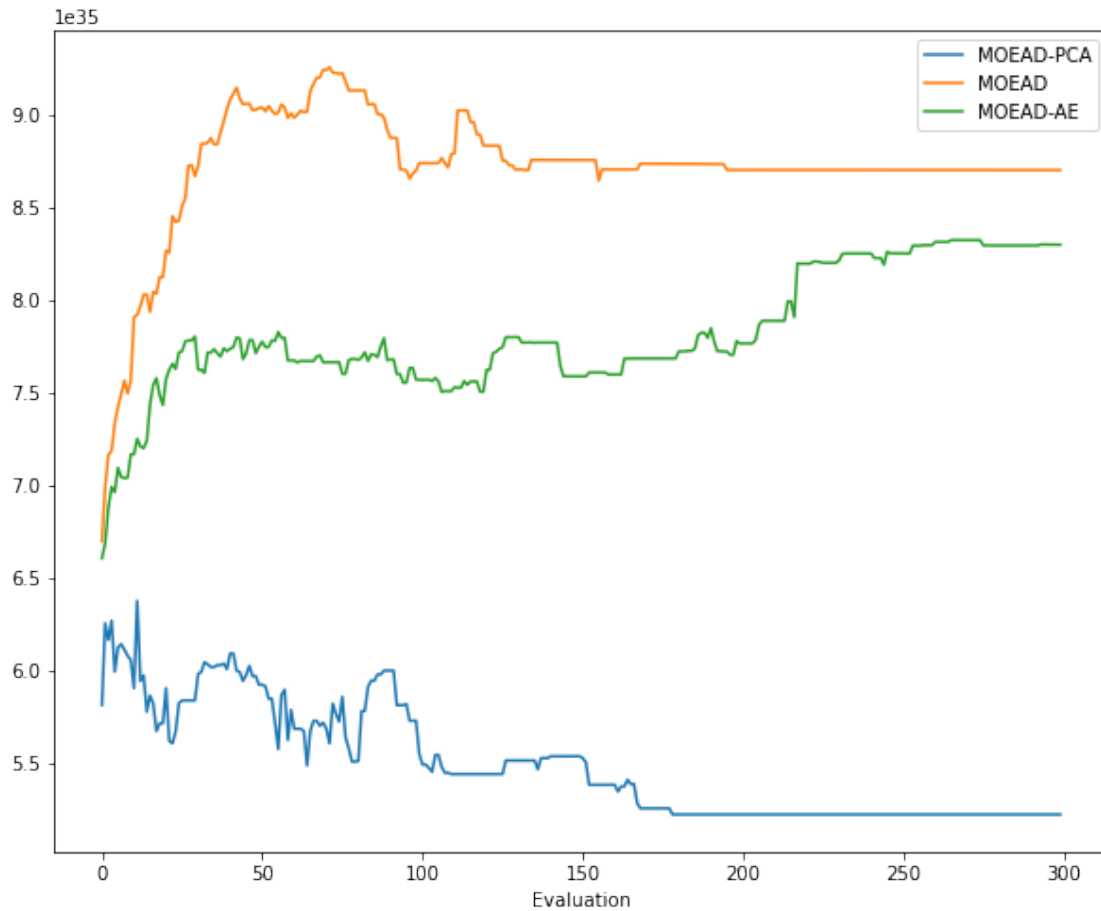
3 MOEAD

```
[46]: file = 'moead-original-pareto-execution-'
instance = 'r100n12tw10k4'
algorithm_folder_2 = 'MOEAD'
algorithm_name_2 = 'MOEAD'
hv_moead_r100, hv_moead_r100_df = mt.plot_hypervolume_convergence(
    os.path.join(algorithm_folder_2, instance),
    file,
    8,
    reference_point=reference_point,
    plot=False)
```

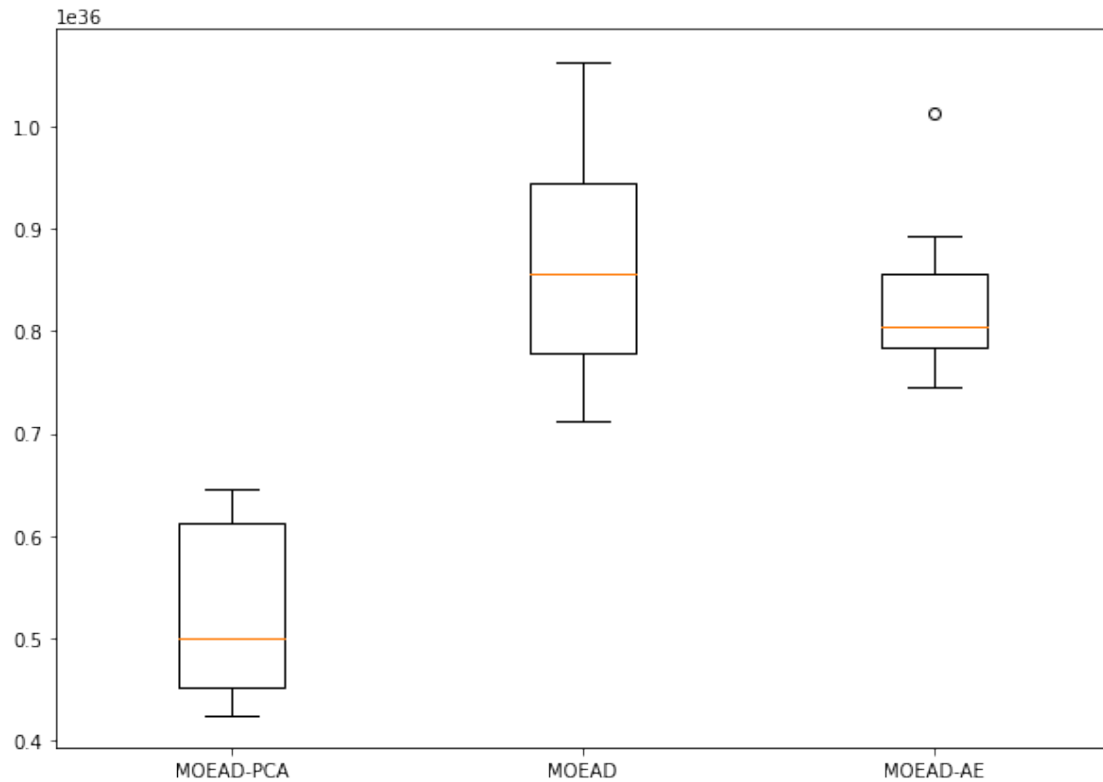
3.1 MOEAD-AE

```
[47]: file = 'moead-original-pareto-execution-'
instance = 'r100n12tw10k4'
algorithm_folder_3 = 'MOEAD_AE'
algorithm_name_3 = 'MOEAD-AE'
hv_moead_ae_r100, hv_moead_ae_r100_df = mt.plot_hypervolume_convergence(
    os.path.join(algorithm_folder_3, instance),
    file,
    8,
    reference_point=reference_point,
    plot=False)
```

```
[48]: plt.figure(figsize=(10,8))
plt.plot(hv_moead_pca_r100, label=algorithm_name_1)
plt.plot(hv_moead_r100, label=algorithm_name_2)
plt.plot(hv_moead_ae_r100, label=algorithm_name_3)
plt.xlabel('Evaluation')
plt.legend()
plt.show()
```



```
[49]: data_to_plot = [hv_moead_pca_r100_df.iloc[299:].values.tolist()[0],
                      hv_moead_r100_df.iloc[299:].values.tolist()[0],
                      hv_moead_ae_r100_df.iloc[299:].values.tolist()[0],
                      ]
plt.figure(figsize=(10, 7))
plt.boxplot(data_to_plot, labels=[algorithm_name_1,
                                algorithm_name_2,
                                algorithm_name_3,
                                ])
plt.show()
```



```
[18]: mt.random_test(hv_moead_ae_r100_df.iloc[299:], hv_moead_r100_df.iloc[299:], 10,
→False)
```

H0
Limiar = 9.90972970960577e+34
z = 0.7932745299024562
Mean Spread Diff 4.0310248227774474e+34

4 Instância r150n12tw10k4

4.1 MOEAD-PCA

```
[23]: reference_point = [480000,150000,150000,150000,150000,150000,150000,1]
file = 'moead-original-pareto-execution-'
instance = 'r150n12tw10k4'
algorithm_folder_1 = 'MOEAD_PCA'
algorithm_name_1 = 'MOEAD-PCA'
hv_moead_pca_r150, hv_moead_pca_r150_df = mt.plot_hypervolume_convergence(
    os.path.join(algorithm_folder_1, instance),
    file,
```

```
8,  
reference_point=reference_point,  
plot=False)
```

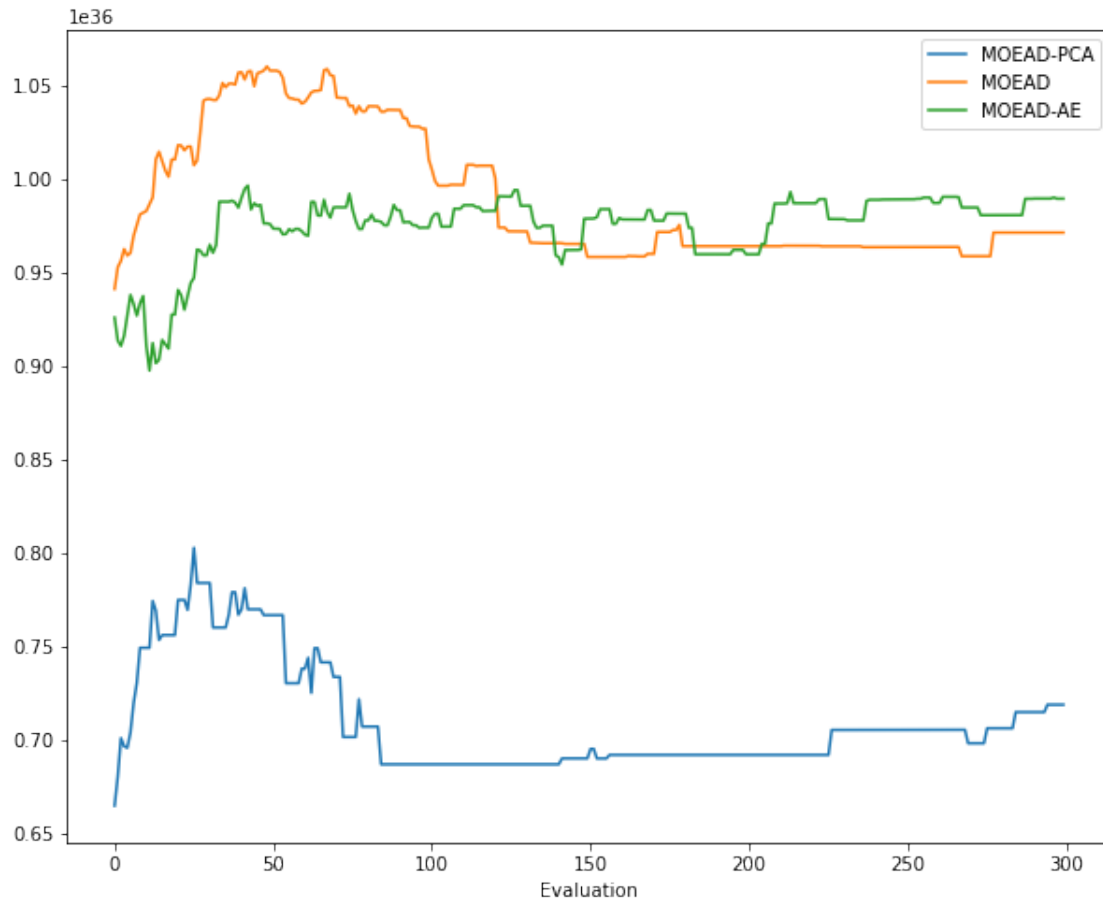
4.2 MOEAD

```
[24]: file = 'moead-original-pareto-execution-'  
instance = 'r150n12tw10k4'  
algorithm_folder_2 = 'MOEAD'  
algorithm_name_2 = 'MOEAD'  
hv_moead_r150, hv_moead_r150_df = mt.plot_hypervolume_convergence(  
    os.path.join(algorithm_folder_2, instance),  
    file,  
    8,  
    reference_point=reference_point,  
    plot=False)
```

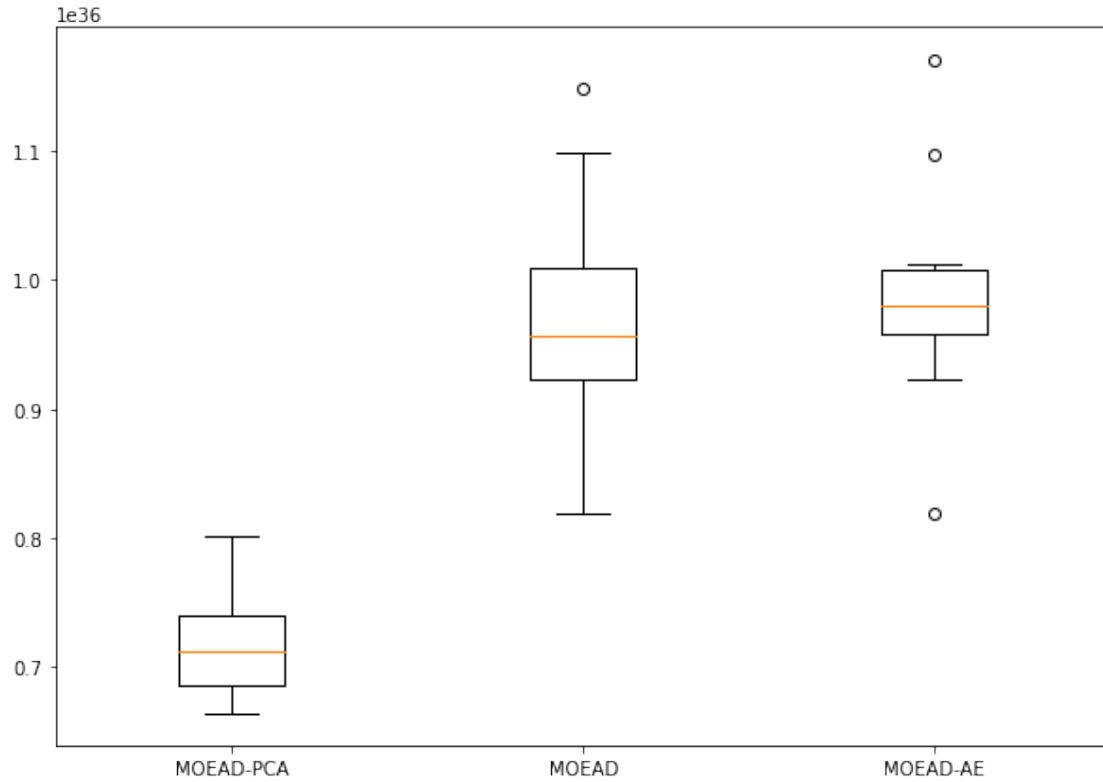
4.3 MOEAD-AE

```
[25]: file = 'moead-original-pareto-execution-'  
instance = 'r150n12tw10k4'  
algorithm_folder_3 = 'MOEAD_AE'  
algorithm_name_3 = 'MOEAD-AE'  
hv_moead_ae_r150, hv_moead_ae_r150_df = mt.plot_hypervolume_convergence(  
    os.path.join(algorithm_folder_3, instance),  
    file,  
    8,  
    reference_point=reference_point,  
    plot=False)
```

```
[26]: plt.figure(figsize=(10,8))  
plt.plot(hv_moead_pca_r150, label=algorithm_name_1)  
plt.plot(hv_moead_r150, label=algorithm_name_2)  
plt.plot(hv_moead_ae_r150, label=algorithm_name_3)  
plt.xlabel('Evaluation')  
plt.legend()  
plt.show()
```

```
[29]: data_to_plot = [hv_moead_pca_r150_df.iloc[299:].values.tolist()[0],
                    hv_moead_r150_df.iloc[299:].values.tolist()[0],
                    hv_moead_ae_r150_df.iloc[299:].values.tolist()[0]
                    ]
plt.figure(figsize=(10, 7))
plt.boxplot(data_to_plot, labels=[algorithm_name_1,
                                algorithm_name_2,
                                algorithm_name_3
                                ])
plt.show()
```



```
[30]: mt.random_test(hv_moead_ae_r150_df.iloc[299:], hv_moead_r150_df.iloc[299:], 10,
→False)
```

H0
Limiar = 1.2060123741515322e+35
z = -0.28506526184622316
Mean Spread Diff -1.8132410123677187e+34

5 Instância r200n12tw10k4

5.1 MOEAD-PCA

```
[31]: reference_point = [550000,150000,150000,150000,150000,150000,150000,1]
file = 'moead-original-pareto-execution-'
instance = 'r200n12tw10k4'
algorithm_folder_1 = 'MOEAD_PCA'
algorithm_name_1 = 'MOEAD-PCA'
hv_moead_pca_r200, hv_moead_pca_r200_df = mt.plot_hypervolume_convergence(
    os.path.join(algorithm_folder_1, instance),
    file,
```

```
8,  
reference_point=reference_point,  
plot=False)
```

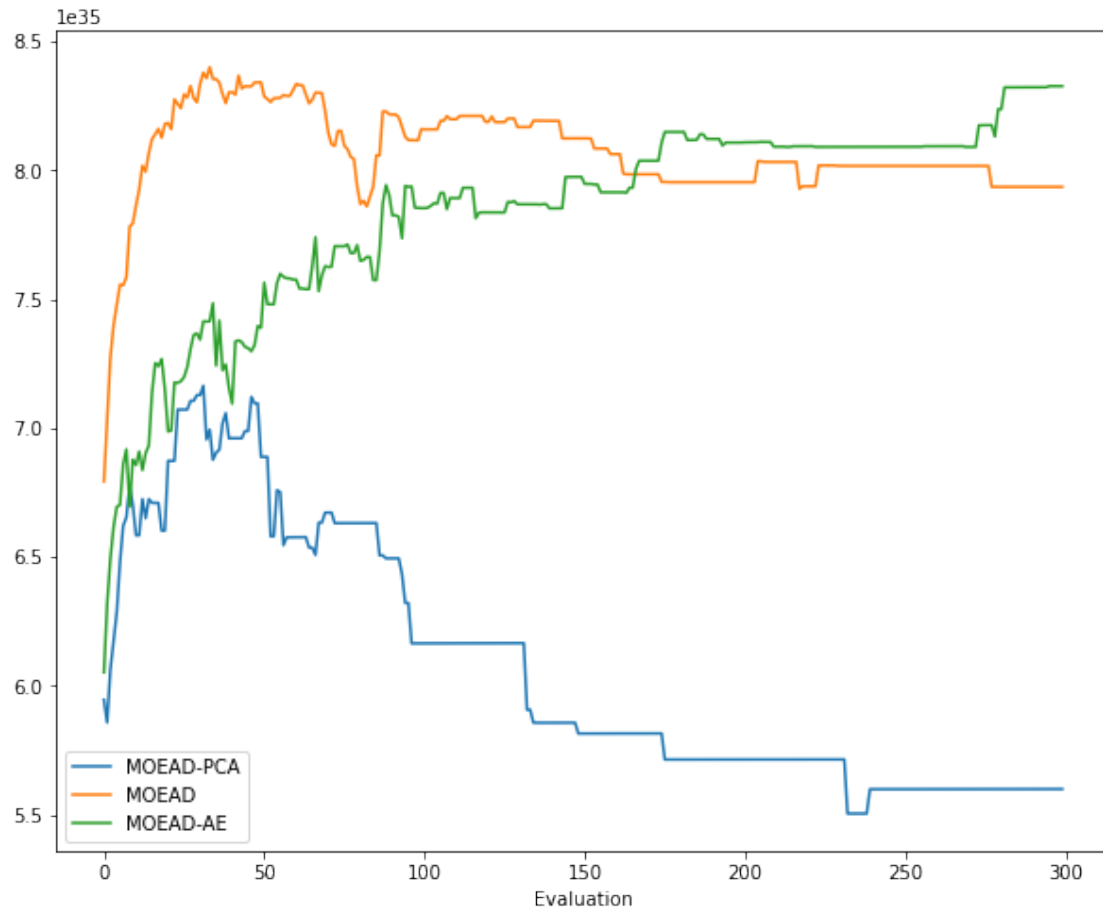
5.2 MOEAD

```
[33]: file = 'moead-original-pareto-execution-'  
instance = 'r200n12tw10k4'  
algorithm_folder_2 = 'MOEAD'  
algorithm_name_2 = 'MOEAD'  
hv_moead_r200, hv_moead_r200_df = mt.plot_hypervolume_convergence(  
    os.path.join(algorithm_folder_2, instance),  
    file,  
    8,  
    reference_point=reference_point,  
    plot=False)
```

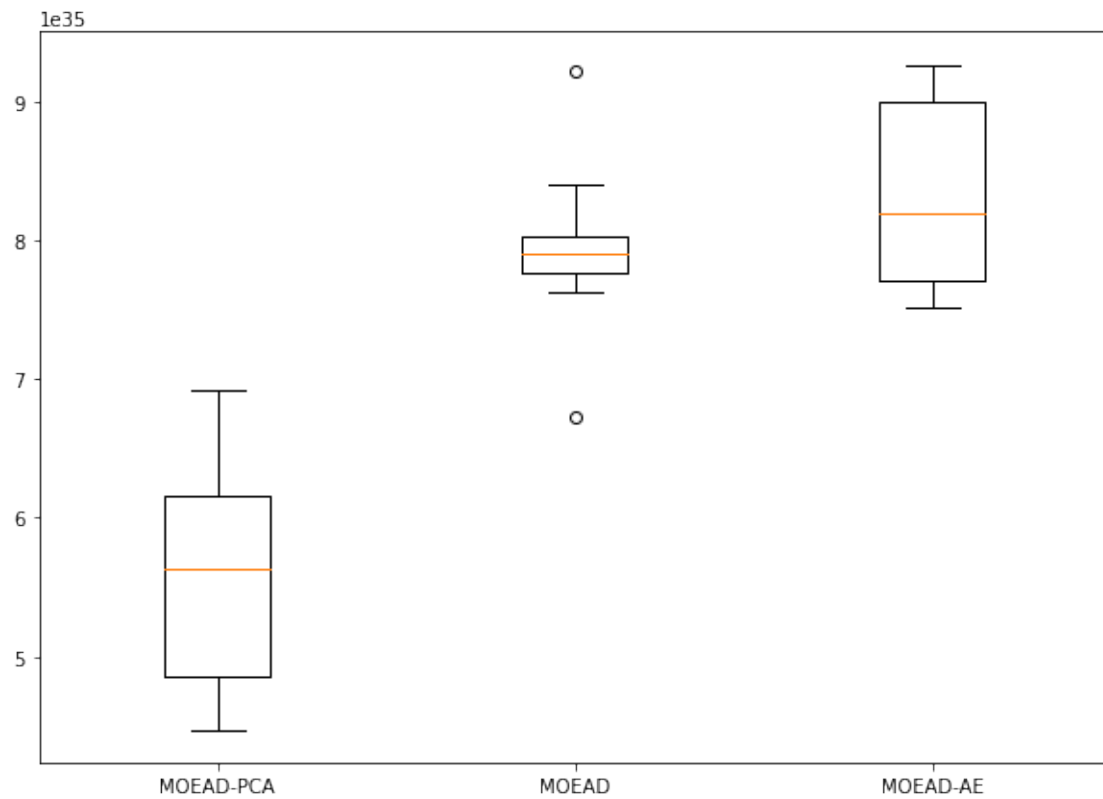
5.3 MOEAD-AE

```
[34]: file = 'moead-original-pareto-execution-'  
instance = 'r200n12tw10k4'  
algorithm_folder_3 = 'MOEAD_AE'  
algorithm_name_3 = 'MOEAD-AE'  
hv_moead_ae_r200, hv_moead_ae_r200_df = mt.plot_hypervolume_convergence(  
    os.path.join(algorithm_folder_3, instance),  
    file,  
    8,  
    reference_point=reference_point,  
    plot=False)
```

```
[36]: plt.figure(figsize=(10,8))  
plt.plot(hv_moead_pca_r200, label=algorithm_name_1)  
plt.plot(hv_moead_r200, label=algorithm_name_2)  
plt.plot(hv_moead_ae_r200, label=algorithm_name_3)  
plt.xlabel('Evaluation')  
plt.legend()  
plt.show()
```



```
[37]: data_to_plot = [hv_moead_pca_r200_df.iloc[299:].values.tolist()[0],
                    hv_moead_r200_df.iloc[299:].values.tolist()[0],
                    hv_moead_ae_r200_df.iloc[299:].values.tolist()[0]
                    ]
plt.figure(figsize=(10, 7))
plt.boxplot(data_to_plot, labels=[algorithm_name_1,
                                algorithm_name_2,
                                algorithm_name_3
                                ])
plt.show()
```



```
[38]: mt.random_test(hv_moead_ae_r200_df.iloc[299:], hv_moead_r200_df.iloc[299:], 10,
↪False)
```

```
H0
Limiar = 8.456537117214563e+34
z = -0.9041070500991306
Mean Spread Diff -3.908279044855248e+34
```

```
[ ]:
```