exercicio_5_2

May 19, 2022

[ ]:
```
import numpy as np
import matplotlib.pyplot as plt
from scipy.interpolate import interp1d
import pandas as pd
import utils
```

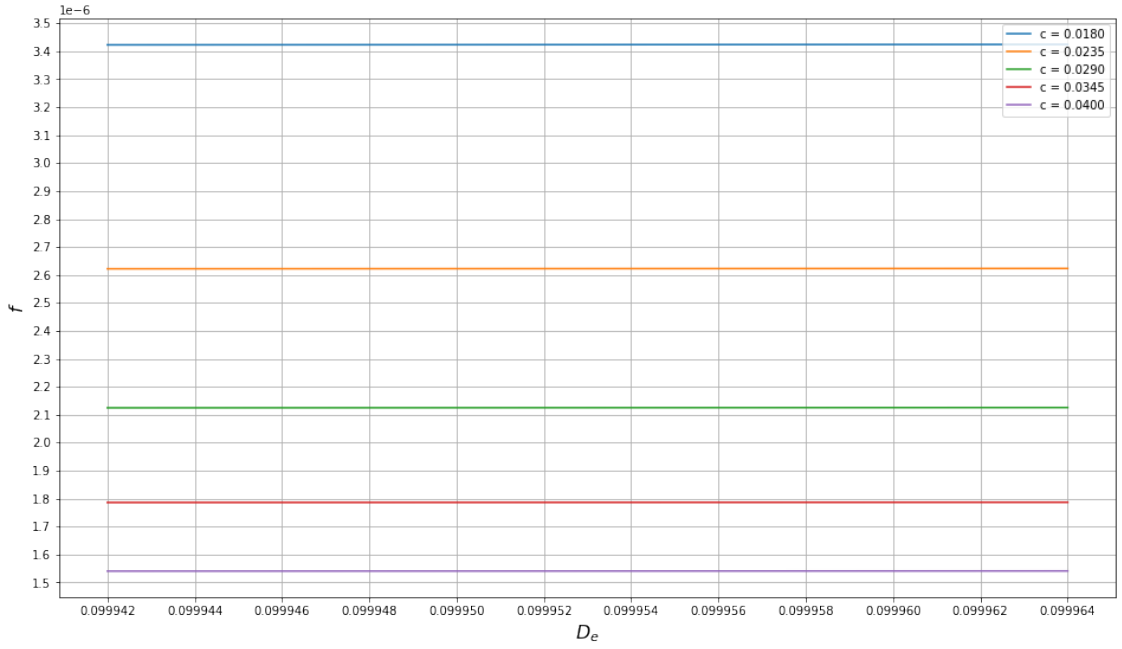
[ ]:
```
# definindo constantes

L = 50e-3
mu = 50e-3
n = 600/60
w = 40e3

# definindo intervalos

De_eval = np.linspace(99.942e-3,99.964e-3, num=500)
c_eval = np.linspace(0.018,0.04, num=5)
```

[ ]:
```
curves_dict = {}

for c in c_eval:
    f_list = []
    Pt_list = []
    for De in De_eval:
        P = w/(De*L)
        f = 2*np.pi**2*mu*n/P * De/(2*c)
        Pt = 2*np.pi*f*w*De*n/2

        f_list.append(f)
        Pt_list.append(Pt)

    curves_dict[c] = (f_list, Pt_list)
```

[ ]:
```
# Análise gráfica

fig = plt.figure(figsize=[16, 9])
fig.suptitle('Coeficiente de atrito em função de $D_e$ e $c$', fontsize=16)
```

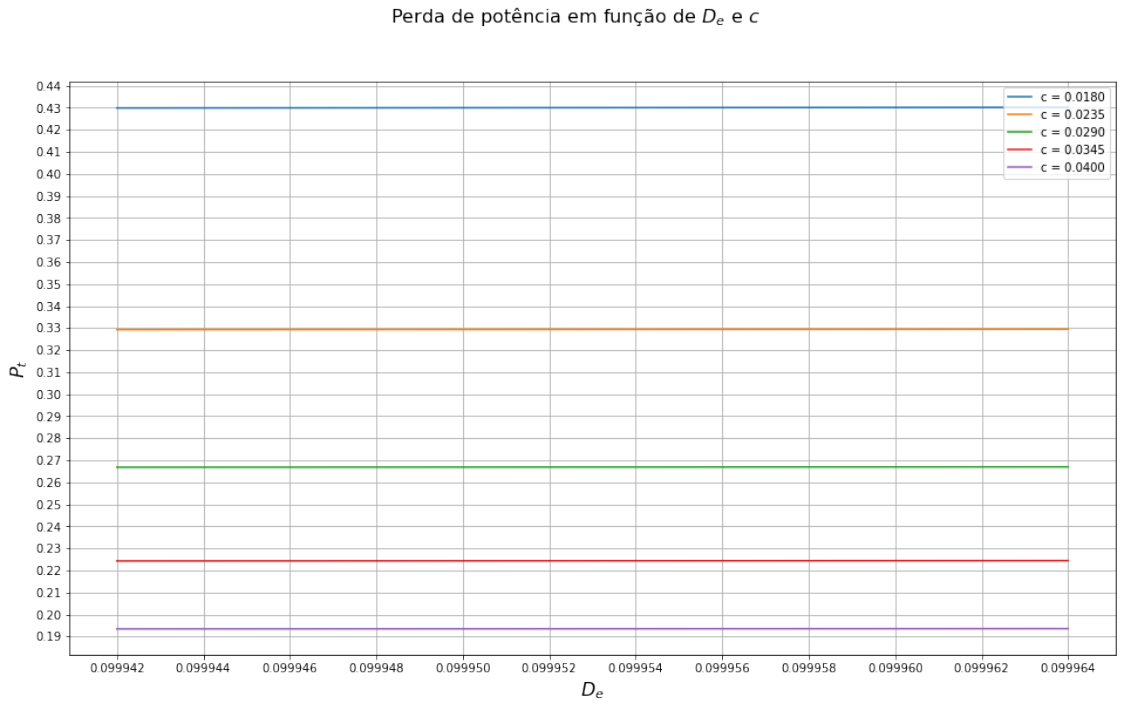
```
# Plotando 2D

ax = fig.add_subplot(1, 1, 1)

for c in curves_dict.keys():

    ax.plot(De_eval,
        curves_dict[c][0],
        label=("c = {:.4f}".format(c))
    )

ax.locator_params(axis='y', nbins=30)
ax.locator_params(axis='x', nbins=15)
ax.set_ylabel('$f$', fontsize=16)
ax.set_xlabel('$D_e$', fontsize=16)
ax.grid()
ax.legend()
plt.show()
```

Coeficiente de atrito em função de D_e e c



[ ]:
```
# Análise gráfica


fig = plt.figure(figsize=[16, 9])
```

```
fig.suptitle('Perda de potência em função de $D_e$ e $c$', fontsize=16)

# Plotando 2D

ax = fig.add_subplot(1, 1, 1)

for c in curves_dict.keys():

    ax.plot(De_eval,
        curves_dict[c][1],
        label=("c = {:.4f}".format(c))
    )

ax.locator_params(axis='y', nbins=30)
ax.locator_params(axis='x', nbins=15)
ax.set_ylabel('$P_t$', fontsize=16)
ax.set_xlabel('$D_e$', fontsize=16)
ax.grid()
ax.legend()
plt.show()
```



[ ]:
```
f_c_list  = [curves_dict[c][0][0] for c in curves_dict.keys()]
Pt_c_list  = [curves_dict[c][0][0] for c in curves_dict.keys()]
```

```
f_min = min(f_c_list)
f_max = max(f_c_list)

Pt_min = min(Pt_c_list)
Pt_max = max(Pt_c_list)


print(f_min,f_max,Pt_min,Pt_max)
```

```
1.5403373406435964e-06 3.422971868096881e-06 1.5403373406435964e-06
3.422971868096881e-06
```

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