

alpha_calc

January 6, 2023

0.1 Calcul de alpha

```
[65]: import matplotlib.pyplot as plt
import numpy as np
from math import *
```

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[66]: f = 50
T = 1/(50*2*128)
```

```
[67]: T
```

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[67]: 7.8125e-05
```

```
[68]: def p(alpha):
return ((alpha*T)/2 - np.sin(2*2*pi*f*alpha*T)/(4*(2*pi*f))) / ((128*T)/2 -
↳np.sin(2*2*pi*f*128*T)/(4*(2*pi*f)))
```

```
[69]: def p2(alpha):
return (np.cos(2*pi*f*alpha*T) - 1)/(np.cos(2*pi*f*128*T) - 1)
```

```
[70]: x, y, y2 = [], [], []
for i in range(1,129):
x.append(i)
y.append(p(i)*100)
y2.append(p2(i)*100)
y.reverse()
y2.reverse()
```

```
[71]: import pandas as pd
d = {'% (p1)': y, '% (p2)': y2, 'alpha': x }
df = pd.DataFrame(data=d)
df
```

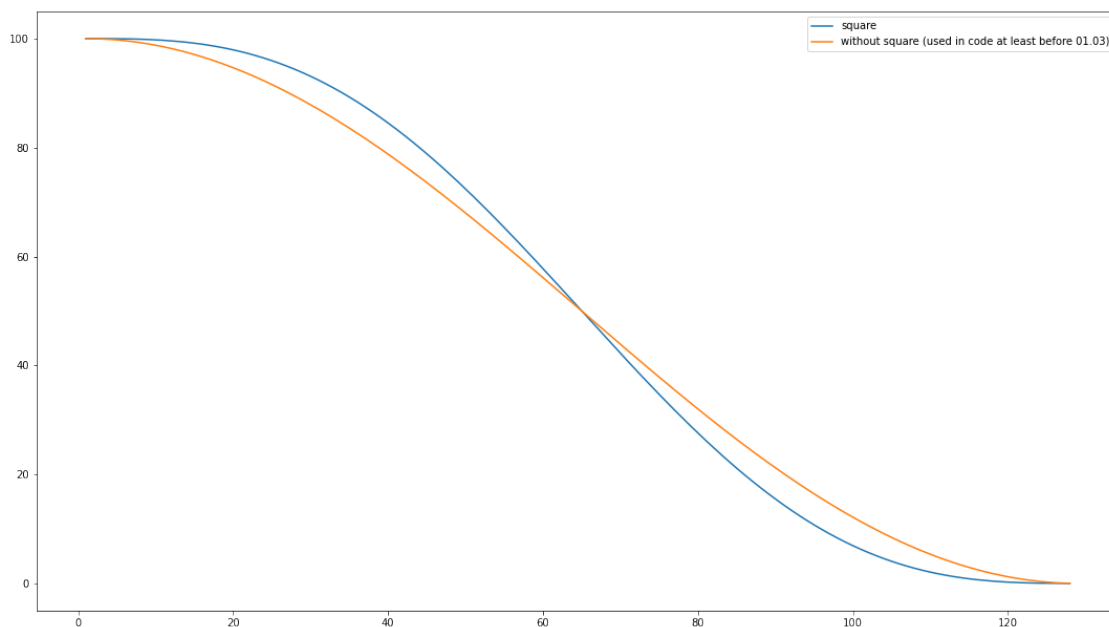
```
[71]:
```

	% (p1)	% (p2)	alpha
0	100.000000	100.000000	1
1	99.999686	99.984941	2
2	99.997491	99.939773	3
3	99.991538	99.864523	4

4	99.979959	99.759236	5
..
123	0.039100	0.376023	124
124	0.020041	0.240764	125
125	0.008462	0.135477	126
126	0.002509	0.060227	127
127	0.000314	0.015059	128

[128 rows x 3 columns]

```
[72]: import matplotlib.pyplot as plt
fig = plt.gcf()
fig.set_size_inches(18.5, 10.5)
plt.plot(x, y, label="square")
plt.plot(x, y2, label="without square (used in code at least before 01.03)")
plt.legend()
plt.show()
```



```
[73]: import json
json.dumps(list(np.array(y)/100))
```

```
[73]: '[1.0, 0.9999968629152317, 0.9999749123911815, 0.99991538031179,
0.9997995890982563, 0.9996089967049625, 0.9993252412888832, 0.9989301854448756,
0.9984059599002769, 0.9977350065635465, 0.9969001208232467, 0.9958844929954593,
0.9946717488197858, 0.9932459889063749, 0.9915918270389458, 0.98969442724153,
0.9875395395196382, 0.9851135341897446, 0.9824034347143866, 0.9793969489637838,
```

```
0.9760824988286518, 0.9724492481128838, 0.9684871286388949, 0.9641868645027443,
0.9595399944206008, 0.9545388921127153, 0.949176784675799, 0.9434477688995373,
0.9373468254879447, 0.9308698311512845, 0.924013568539437, 0.9167757339927779,
0.9091549430918953, 0.9011507339927779, 0.892763568539437, 0.8839948311512843,
0.8748468254879448, 0.8653227688995375, 0.8554267846757989, 0.8451638921127155,
0.8345399944206007, 0.8235618645027443, 0.8122371286388949, 0.8005742481128838,
0.7885824988286518, 0.7762719489637838, 0.7636534347143867, 0.7507385341897443,
0.7375395395196384, 0.7240694272415298, 0.7103418270389456, 0.6963709889063749,
0.6821717488197858, 0.6677594929954594, 0.6531501208232467, 0.6383600065635465,
0.623405959900277, 0.6083051854448758, 0.5930752412888832, 0.5777339967049625,
0.5622995890982565, 0.54679038031179, 0.5312249123911815, 0.5156218629152319,
0.5, 0.4843781370847682, 0.4687750876088185, 0.4532096196882101,
0.4377004109017436, 0.42226600329503744, 0.4069247587111168, 0.3916948145551242,
0.3765940400997231, 0.36163999343645353, 0.3468498791767532,
0.33224050700454055, 0.3178282511802142, 0.3036290110936251,
0.28965817296105445, 0.2759305727584701, 0.2624604604803617,
0.24926146581025574, 0.2363465652856134, 0.22372805103621626,
0.21141750117134817, 0.1994257518871162, 0.18776287136110517,
0.1764381354972557, 0.1654600055793993, 0.15483610788728455, 0.1445732153242011,
0.13467723110046242, 0.12515317451205524, 0.11600516884871569,
0.1072364314605631, 0.09884926600722216, 0.09084505690810467,
0.08322426600722216, 0.07598643146056307, 0.06913016884871562,
0.06265317451205528, 0.05655223110046245, 0.05082321532420108,
0.04546110788728452, 0.040460005579399286, 0.035813135497255705,
0.03151287136110518, 0.027550751887116188, 0.023917501171348145,
0.020603051036216232, 0.017596565285613368, 0.014886465810255689,
0.01246046048036175, 0.010305572758470072, 0.008408172961054403,
0.006754011093625144, 0.005328251180214178, 0.004115507004540564,
0.003099879176753182, 0.002264993436453455, 0.0015940400997229548,
0.0010698145551242566, 0.000674758711116842, 0.00039100329503754817,
0.00020041090174357612, 8.461968821009934e-05, 2.508760881846431e-05,
3.137084768132625e-06]'
```

```
[74]: json.dumps(list(np.array(y2)/100))
```

```
[74]: '[1.0, 0.9998494093481021, 0.9993977281025862, 0.9986452283393451,
0.9975923633360985, 0.996239767299355, 0.9945882549823906, 0.9926388211944706,
0.9903926402016152, 0.9878510650192642, 0.985015626597272, 0.98188803289772,
0.9784701678661044, 0.9747640902965183, 0.9707720325915103, 0.9664963994173693,
0.9619397662556435, 0.9571048778517653, 0.9519946465617217, 0.9466121505977577,
0.9409606321741777, 0.9350434955543556, 0.9288643050001358, 0.9224267826248536,
0.9157348061512727, 0.9087924065757921, 0.9016037657403224, 0.8941732138133031,
0.8865052266813684, 0.8786044232532423, 0.8704755626774796, 0.8621235414757333,
0.8535533905932737, 0.8447702723685336, 0.8357794774235091, 0.8265864214768883,
0.8171966420818229, 0.8076157952903134, 0.7978496522462166, 0.7879040957089228,
0.7777851165098011, 0.7674988099435487, 0.7570513720966108, 0.746449096114892,
0.7356983684129988, 0.7248056648273034, 0.7137775467151412, 0.702620657002495,
```

0.691341716182545, 0.6799475182674941, 0.6684449266961101, 0.6568408701994457,
0.6451423386272314, 0.6333563787374492, 0.6214900899516319, 0.609550620078435,
0.5975451610080641, 0.5854809443801506, 0.573365237227681, 0.5612053375996082,
0.5490085701647803, 0.5367822817998338, 0.524533837163709, 0.5122706142614561,
0.4999999999999999, 0.48772938573854385, 0.47546616283629106,
0.4632177182001663, 0.4509914298352197, 0.43879466240039183,
0.42663476277231915, 0.4145190556198494, 0.40245483899193596,
0.39044937992156514, 0.3785099100483681, 0.3666436212625508, 0.3548576613727688,
0.34315912980055413, 0.33155507330389, 0.320052481732506, 0.3086582838174551,
0.29737934299750507, 0.286222453284859, 0.2751943351726967, 0.2643016315870012,
0.2535509038851079, 0.24294862790338917, 0.23250119005645142,
0.22221488349019894, 0.2120959042910774, 0.20215034775378332,
0.1923842047096866, 0.18280335791817726, 0.17341357852311162,
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0.11349477331863156, 0.10582678618669689, 0.09839623425967753,
0.09120759342420814, 0.08426519384872738, 0.0775732173751465, 0.071135694999864,
0.06495650444564427, 0.059039367825822475, 0.05338784940224234,
0.04800535343827833, 0.04289512214823466, 0.03806023374435663,
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0.005411745017609493, 0.0037602327006450165, 0.0024076366639015356,
0.0013547716606548965, 0.0006022718974137975, 0.00015059065189787502]'