

PSF_Polar_Data

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In [1]: import pandas as pd
import numpy as np
import pickle
from scipy import interpolate
from scipy.optimize import brentq

In [2]: a = !ls /scratch/jdg1g14/all_resultspc1/vox*
b = !ls /scratch/jdg1g14/all_resultspc2/vox*
files = a+b
files

Out[2]: ['ls: /scratch/jdg1g14/all_resultspc1/vox*: No such file or directory',
'ls: /scratch/jdg1g14/all_resultspc2/vox*: No such file or directory']

In [19]: sig_coeffs = pickle.load( open( "ERF_Sigmoid_Coeffs.p", "rb" ) )

In [20]: def PSF(coeffs):

    rss = np.linspace(25,35,100)

    Y = sigmoid(rss,*coeffs)
    PSF = np.diff(Y)

    f = interpolate.interp1d(np.linspace(25,35,99),-PSF/max(-PSF))

    def opti_f(x):
        return f(x) - 0.5

    half_width = brentq(opti_f,30,35)

    return half_width,PSF

def sigmoid(x, a,x0, k,d):
    y = a / (1 + np.exp(-k*(x-x0))) + d
    return y

In [21]: fout = open('halfwidths_PSF.dat','w')
PSFs = []
for ind,file in enumerate(files):
    fout.write(file)
    PSF_file = []
    for i in range(3):
        width,modtransfunc = PSF(sig_coeffs[ind][i])
        fout.write(','+str(width))
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        PSF_file.append(modtransfunc)
        fout.write('\n')
        PSFs.append(PSF_file)
    fout.close()

In [22]: df2 = pd.read_csv('halfwidths_PSF.dat',header=None,names=['name','xslice','yslice', \
                                                                    'zslice','Index'])

df2.Index = df2.index

df2['mag'] = df2.name.apply(lambda x : float(x.split('/')[1].split('_')[1]))
df2['exp'] = df2.name.apply(lambda x : float(x.split('/')[1].split('_')[2]))
df2['Soffset'] = df2.name.apply(lambda x : 1.0 if x.split('/')[1].split('_')[4][1] == '1' \
                                     else 0.0)
df2['Doffset'] = df2.name.apply(lambda x : 1.0 if x.split('/')[1].split('_')[3][1] == '1' \
                                     else 0.0)
df2.xslice = df2.xslice.apply(lambda x : np.abs(30-x))
df2.yslice = df2.yslice.apply(lambda x : np.abs(30-x))
df2.zslice = df2.zslice.apply(lambda x : np.abs(30-x))
df2.head()

Out[22]:
      name  xslice  yslice \
0 /scratch/jdg1g14/all_resultspc1/vox_1.5_1.D0.S... 0.344026 0.467851
1 /scratch/jdg1g14/all_resultspc1/vox_1.5_1.D0.S... 0.527367 0.576481
2 /scratch/jdg1g14/all_resultspc1/vox_1.5_1.D1.S... 0.826644 0.827007
3 /scratch/jdg1g14/all_resultspc1/vox_1.5_1.D1.S... 0.896168 0.897161
4 /scratch/jdg1g14/all_resultspc1/vox_1.5_2.D0.S... 0.344029 0.467850

      zslice  Index  mag  exp  Soffset  Doffset
0  0.467848      0  1.5   1         0         0
1  0.576794      1  1.5   1         1         0
2  0.830890      2  1.5   1         0         1
3  0.896359      3  1.5   1         1         1
4  0.467851      4  1.5   2         0         0

In [23]: df2.to_pickle('PSFHalfPolar.p')
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