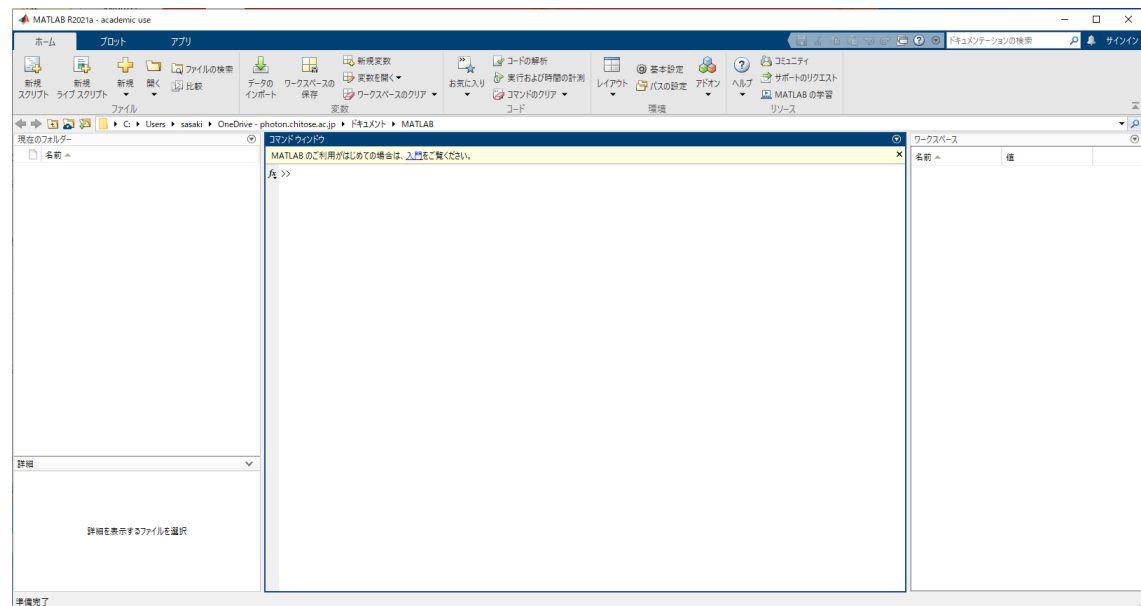


# Objective

CUDAを自習して大規模計算への準備を行う

# Approach

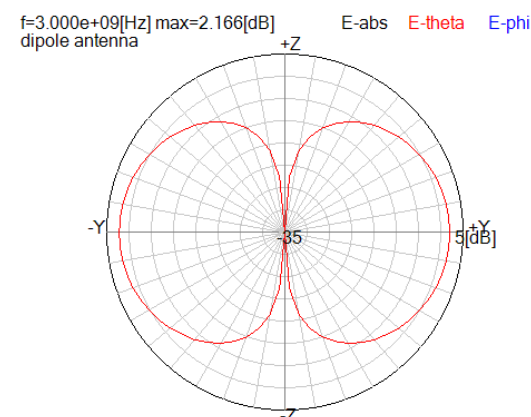
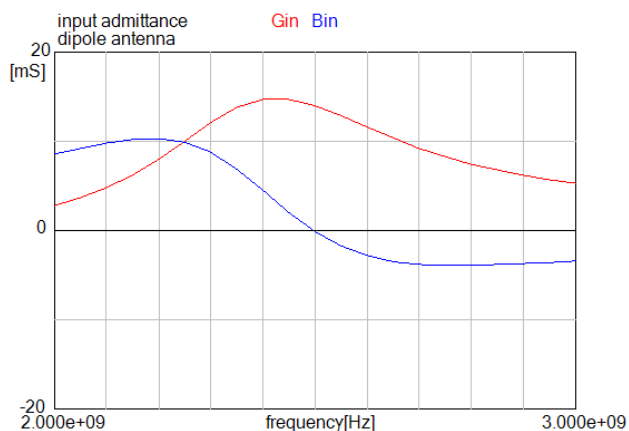
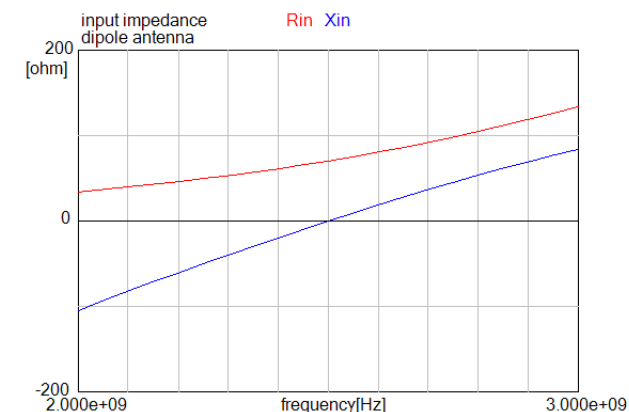
- CUDAを学習しようと試みたが、環境構築の段階で詰まった上、Jetsonが不調になってしまったため一旦保留
- MathWorksのアカウントを作成、MATLABをインストール



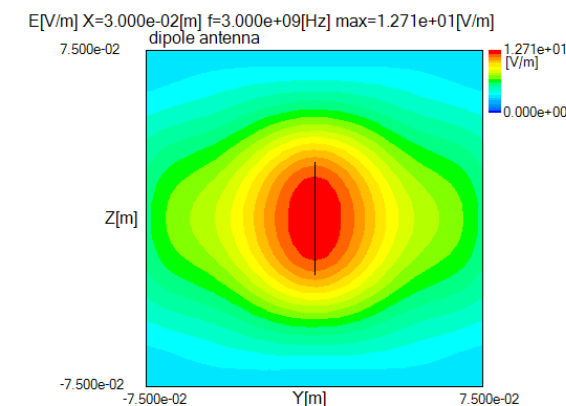
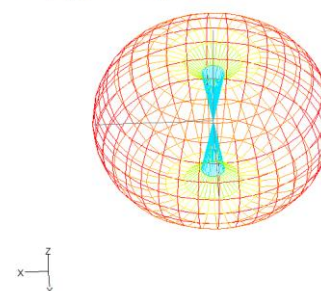
# Keyfinding

- numericalFDTDを使用する予定であるため、事前学習としてOpenFDTDに触れてみた  
ダイポールアンテナの計算を行った

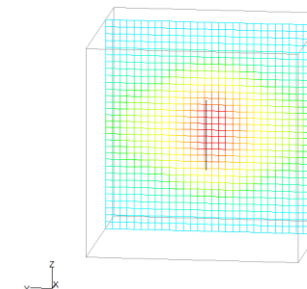
```
C:\Users\kasaki\Downloads\OpenFDTD\OpenFDTD\ofd.exe
<<< OpenFDTD (CPU+OpenMP) Ver.2.6.2 >>>
Thread = 1, Process = 1
Wed Sep  8 11:28:21 2021
Title = dipole antenna
Source = feed
Cells = 30 x 30 x 31 = 27900
No. of Materials = 2
No. of Geometries = 1
No. of Feeds = 1
No. of Points = 0
No. of Freq.s (1) = 21
No. of Freq.s (2) = 1
CPU Memory size = 3 [MB]
Output file size = 2 [MB]
ABF = Murlet
Dt[sec] = 0.30889e-12, Tw[sec] = 5.0800e-10, Tw/Dt = 54.572
Iterations = 1000, Convergence = 1.000e-03
=== iteration start ===
step  0 0.000000 0.000000
50 1.344125 0.751769
100 4.957039 3.894715
150 2.445038 2.057653
200 0.958981 0.874313
250 0.408520 0.375383
300 0.188227 0.169874
350 0.091857 0.077735
400 0.040359 0.034269
450 0.019424 0.014121
500 0.008610 0.006112
550 0.003117 0.002753
=== converged ===
=== input impedance ===
Feed #1 (Z0[ohm] = 50.00)
Frequency[Hz] Rin[ohm] Xin[ohm] Gin[mS] Bin[mS] Ref[dB] VSWR
2.0000e+09 34.621 -104.556 2.854 8.619 -2.095 8.332
2.0500e+09 37.417 -92.394 3.724 9.255 -2.671 6.554
2.1000e+09 40.395 -81.764 4.857 9.831 -3.408 5.162
2.1500e+09 43.509 -70.812 6.299 10.252 -4.347 4.079
2.2000e+09 46.779 -60.071 8.070 10.363 -5.545 3.239
2.2500e+09 50.254 -49.524 10.095 9.948 -7.074 2.590
2.3000e+09 53.949 -39.187 12.134 8.814 -9.007 2.099
2.3500e+09 57.848 -29.054 13.805 6.933 -11.391 1.738
2.4000e+09 61.951 -19.068 14.742 4.642 -14.053 1.495
2.4500e+09 66.295 -9.256 14.756 2.068 -16.883 1.383
2.5000e+09 70.938 0.439 14.086 -0.087 -19.231 1.419
2.5500e+09 75.909 9.954 12.951 -1.698 -21.161 1.563
2.6000e+09 81.134 19.252 11.661 -2.765 -22.765 1.764
2.6500e+09 86.777 28.346 10.413 -3.401 -24.566 1.996
2.7000e+09 92.695 37.245 9.288 -3.722 -26.509 2.248
2.7500e+09 98.993 45.890 8.315 -3.855 -27.919 2.512
2.8000e+09 105.626 54.188 7.495 -3.845 -28.535 2.782
2.8500e+09 112.484 62.139 6.811 -3.763 -29.907 3.053
2.9000e+09 119.537 69.830 6.237 -3.644 -30.993 3.324
2.9500e+09 126.849 77.282 5.749 -3.503 -31.864 3.595
3.0000e+09 134.388 84.420 5.336 -3.352 -34.604 3.861
=== output files ===
ofd.log, geom@d.htm, ofd.out
=== cpu time [sec] ===
part-1 : 0.406
part-2 : 0.011
total : 0.417
```



dipole antenna  
E-abs[dB] f=3.000e+09[Hz]  
directive gain = 2.428[dBi]  
efficiency = 94.156[%]  
max[deg] @ theta=90.0, phi=270.0



E[V/m] X=3.000e-02[m] f=3.000e+09[Hz] max=1.271e+01[V/m]  
dipole antenna



# Next Action

- CUDA、MATLABなどを自習
- ホログラム計算方法について調査