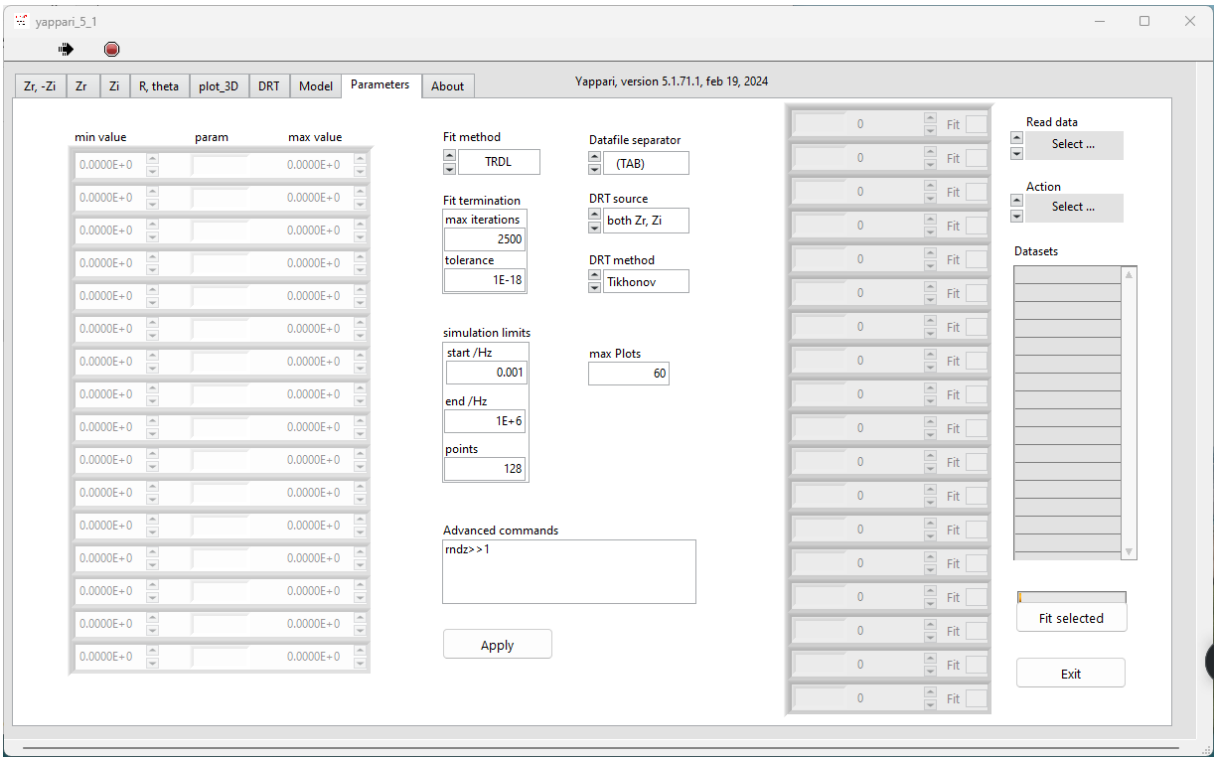
A quick start

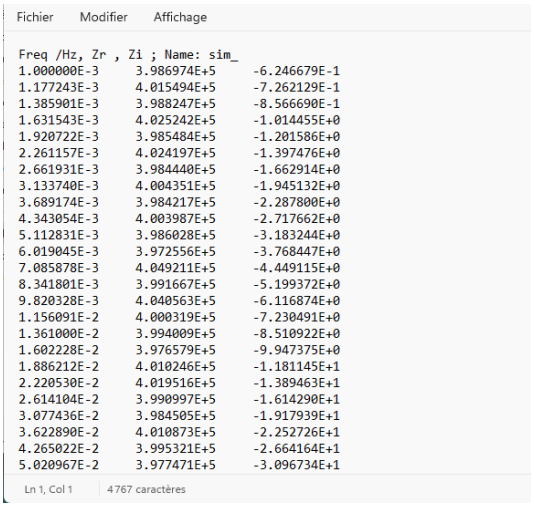
18 feb 2024

If you don’t want to read all the Readme.md documentation, at least at the beginning of using this program, let’s make a quick start of the program.

Once installed, when opening the program go to Parameters page and set the “Datafile separator” to “TAB” as we are going to read a file which has the values separated by “tab”. This is the most common separator but you can change it if you are using others.



The file we’ll open is quick_start.dat and is located in /files. We’ll use *Read data: 3 columns*

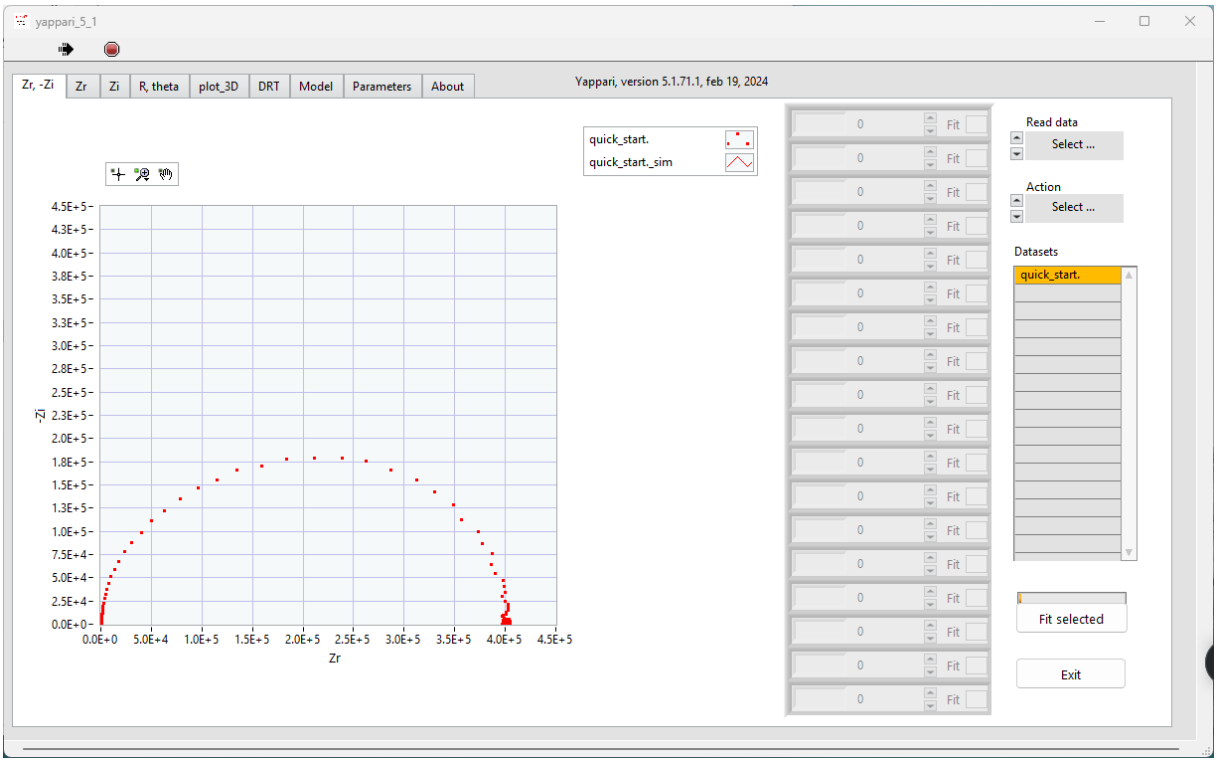


Fichier Modifier Affichage

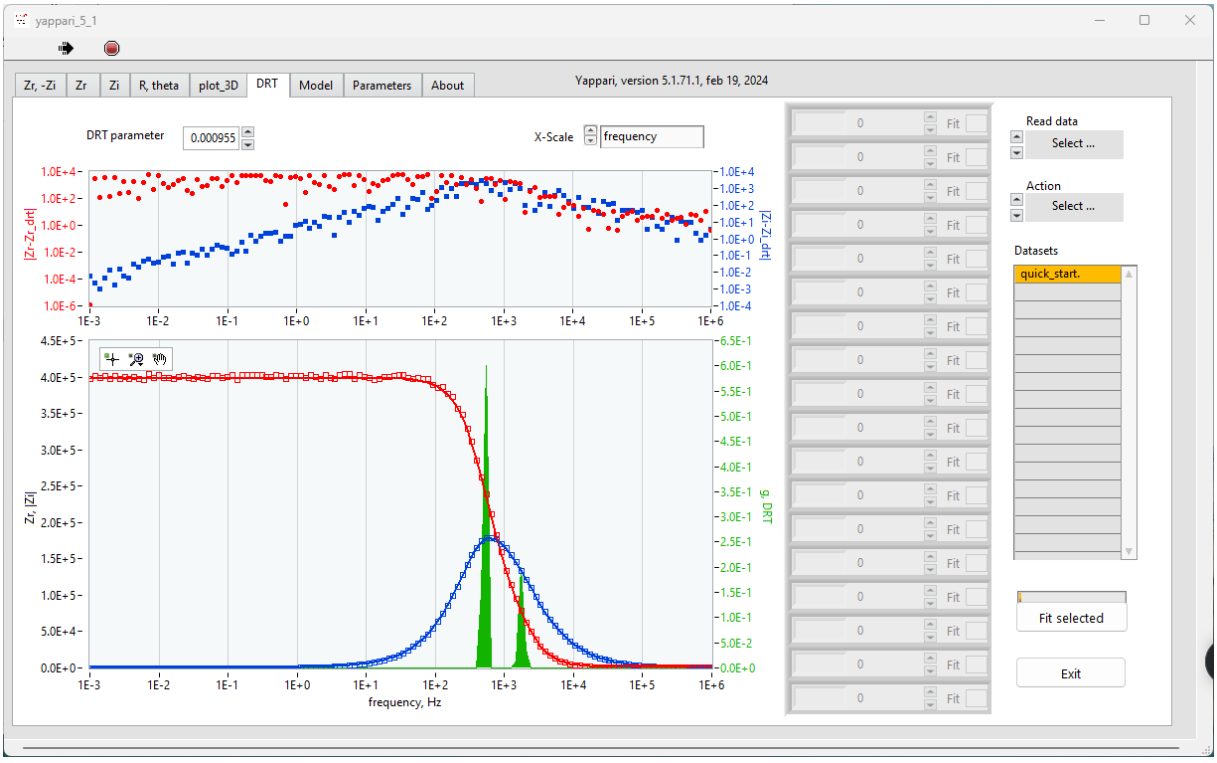
```
Freq /Hz, Zr , Zi ; Name: sim_
1.000000E-3     3.986974E+5     -6.246679E-1
1.177243E-3     4.015494E+5     -7.262129E-1
1.385901E-3     3.988247E+5     -8.566690E-1
1.631543E-3     4.025242E+5     -1.014455E+0
1.920722E-3     3.985484E+5     -1.201586E+0
2.261157E-3     4.024197E+5     -1.397476E+0
2.661931E-3     3.984440E+5     -1.662914E+0
3.133740E-3     4.004351E+5     -1.945132E+0
3.689174E-3     3.984217E+5     -2.287800E+0
4.343054E-3     4.003987E+5     -2.717662E+0
5.112831E-3     3.986028E+5     -3.183244E+0
6.019045E-3     3.972556E+5     -3.768447E+0
7.085878E-3     4.049211E+5     -4.449115E+0
8.341801E-3     3.991667E+5     -5.199372E+0
9.820328E-3     4.040563E+5     -6.116874E+0
1.156091E-2     4.000319E+5     -7.230491E+0
1.361000E-2     3.994009E+5     -8.510922E+0
1.602228E-2     3.976579E+5     -9.947375E+0
1.886212E-2     4.010246E+5     -1.181145E+1
2.220530E-2     4.019516E+5     -1.389463E+1
2.614104E-2     3.990997E+5     -1.614290E+1
3.077436E-2     3.984505E+5     -1.917939E+1
3.622890E-2     4.010873E+5     -2.252726E+1
4.265022E-2     3.995321E+5     -2.664164E+1
5.020967E-2     3.977471E+5     -3.096734E+1
```

Ln 1, Col 1 4 767 caractères

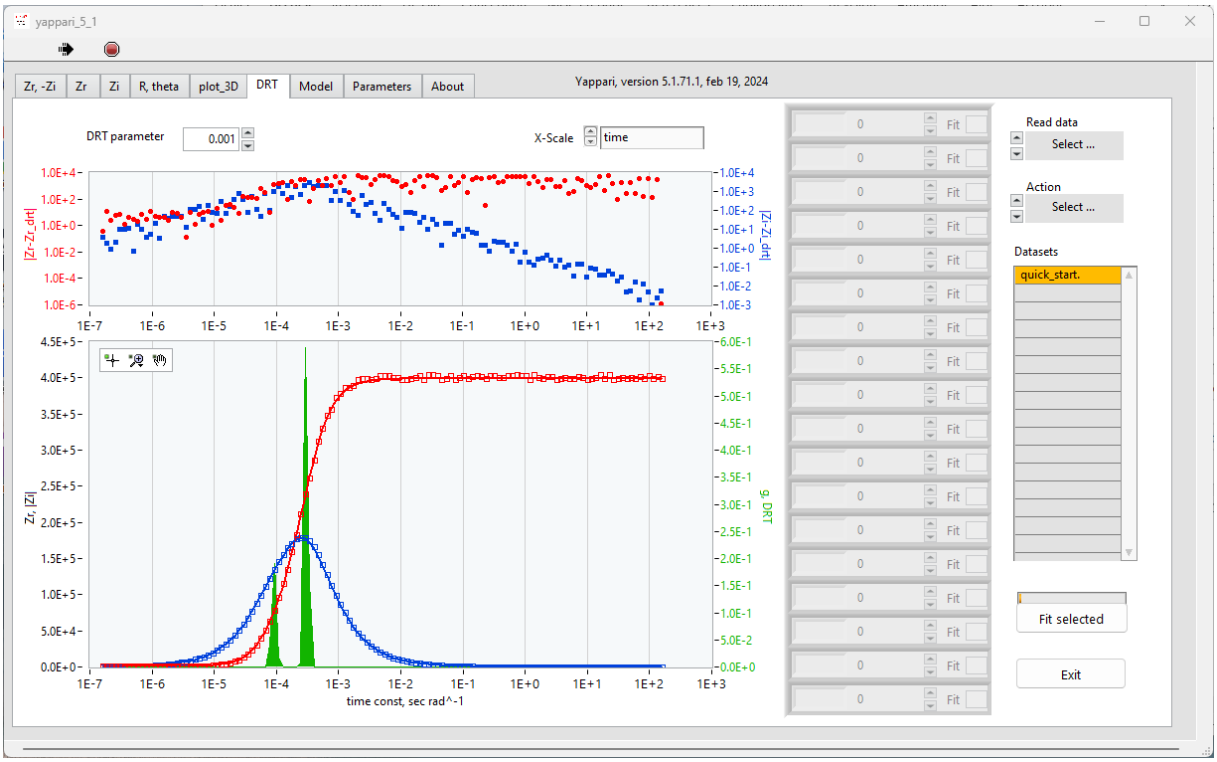
The first line is a text, it will be ignored (if this text contains numbers, some error may appear). Once read, the data is plotted and an item appears in the Datasets list:



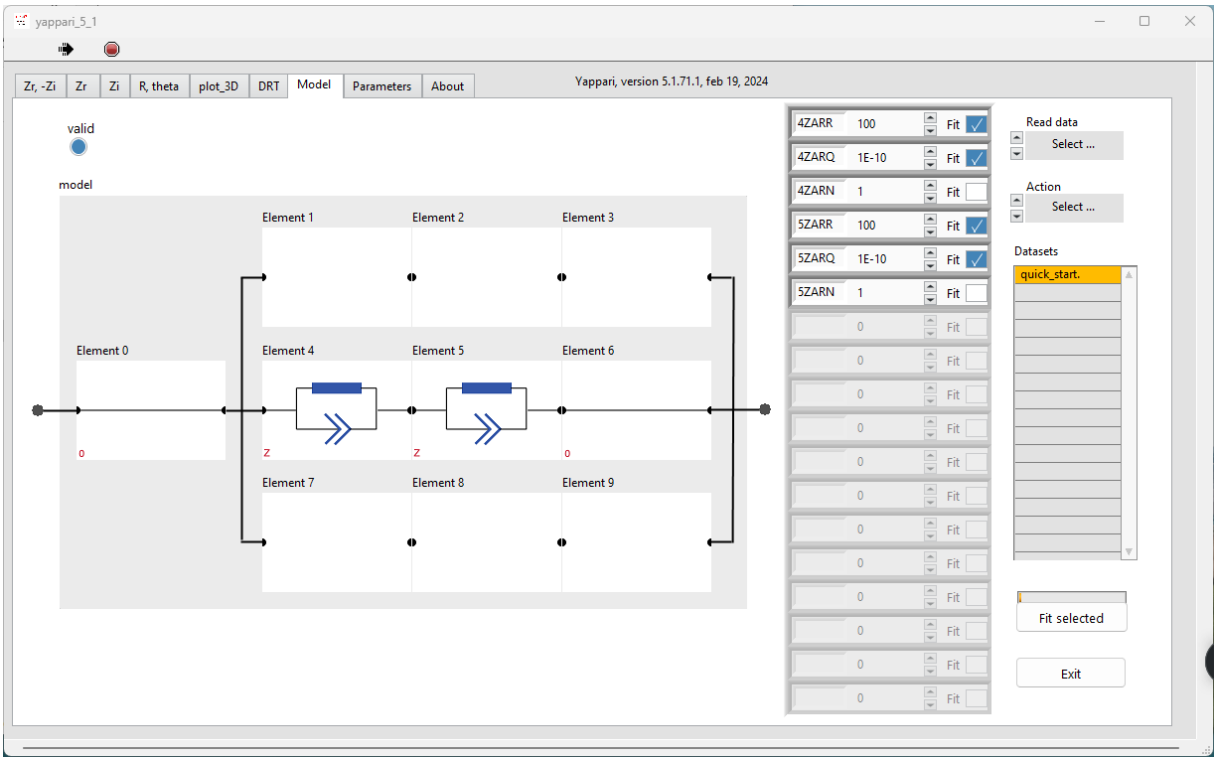
This is a simulated datafile (with Yappari) with a random noise up to 1% of the magnitude of Z. If we assume that this data can pe described by simple RC or RQ, we can take a look at the DRT signal.



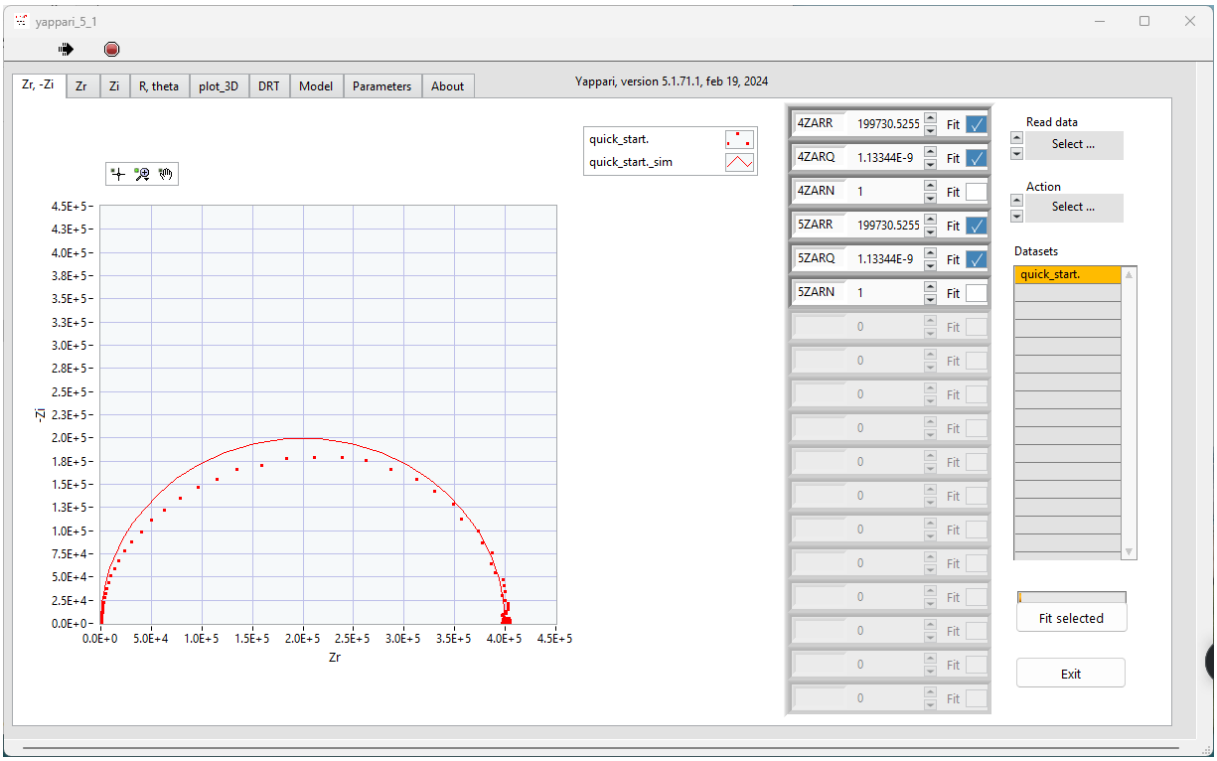
We can see 2 signals, one can also get their relaxation times and the relative magnitudes of their contribution to the signal.



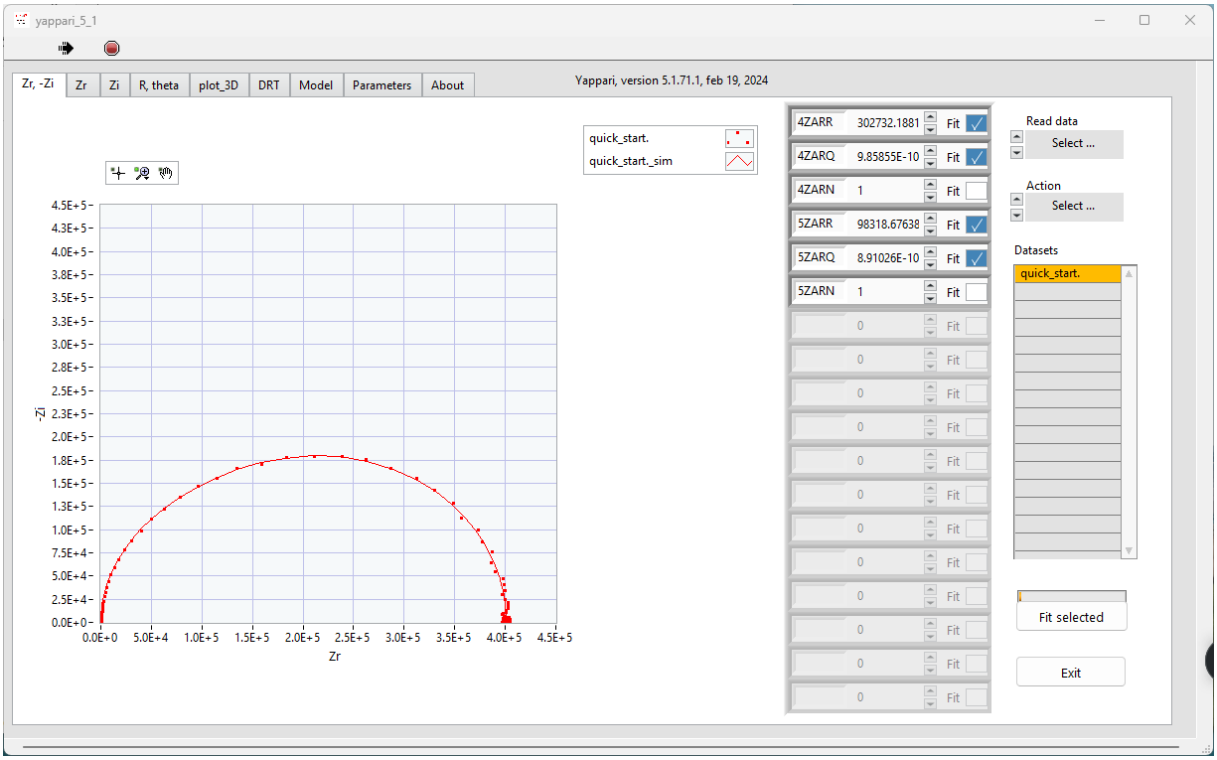
Let’s make a model with 2 RC.



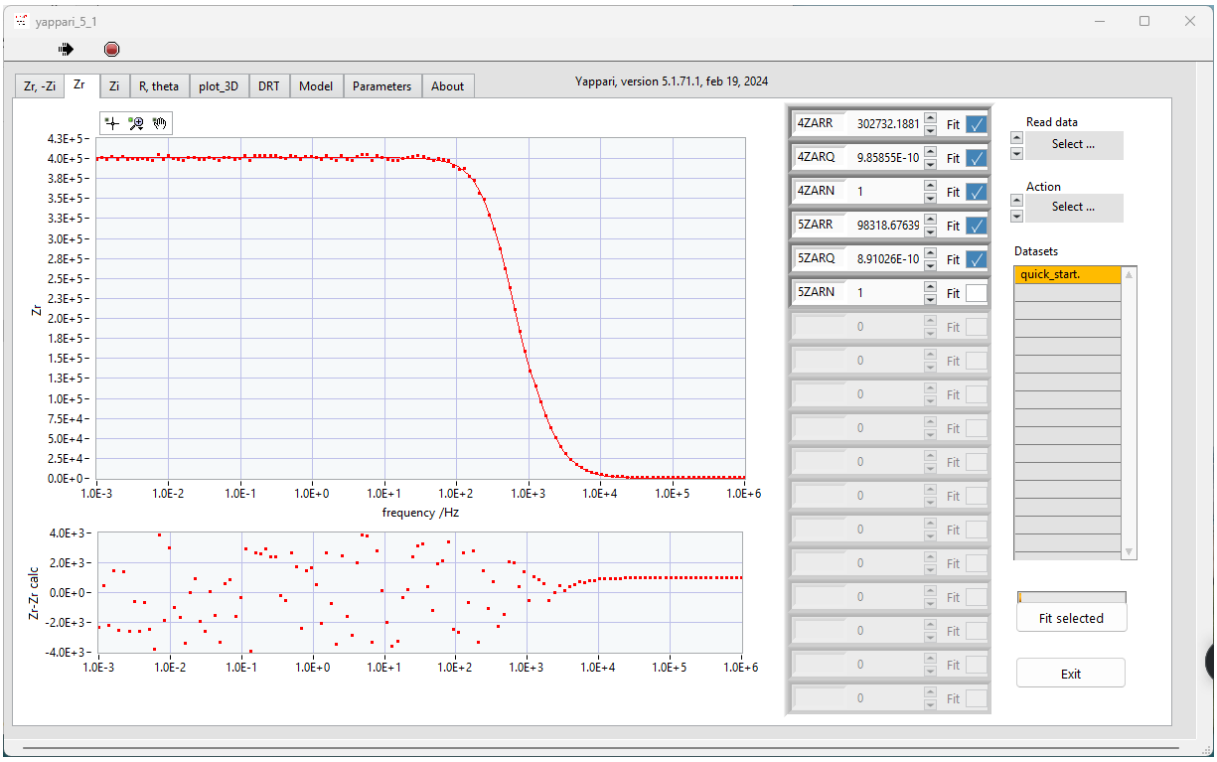
Fitting this model directly gives something like this (not very good), since both RC in the starting parameters are identical the fit is not very good.



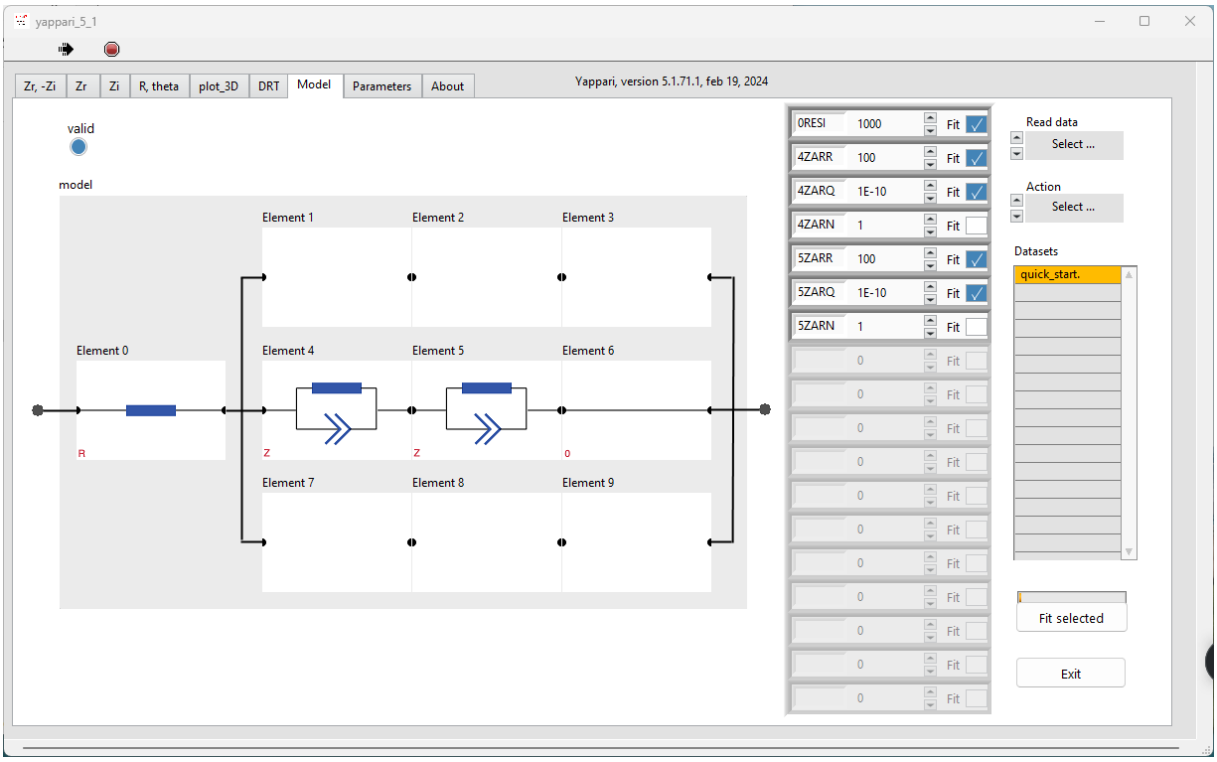
Slightly changing one of the two (we can remember from DRT calculations that they have different time constants and different magnitudes), a new fit gives this:



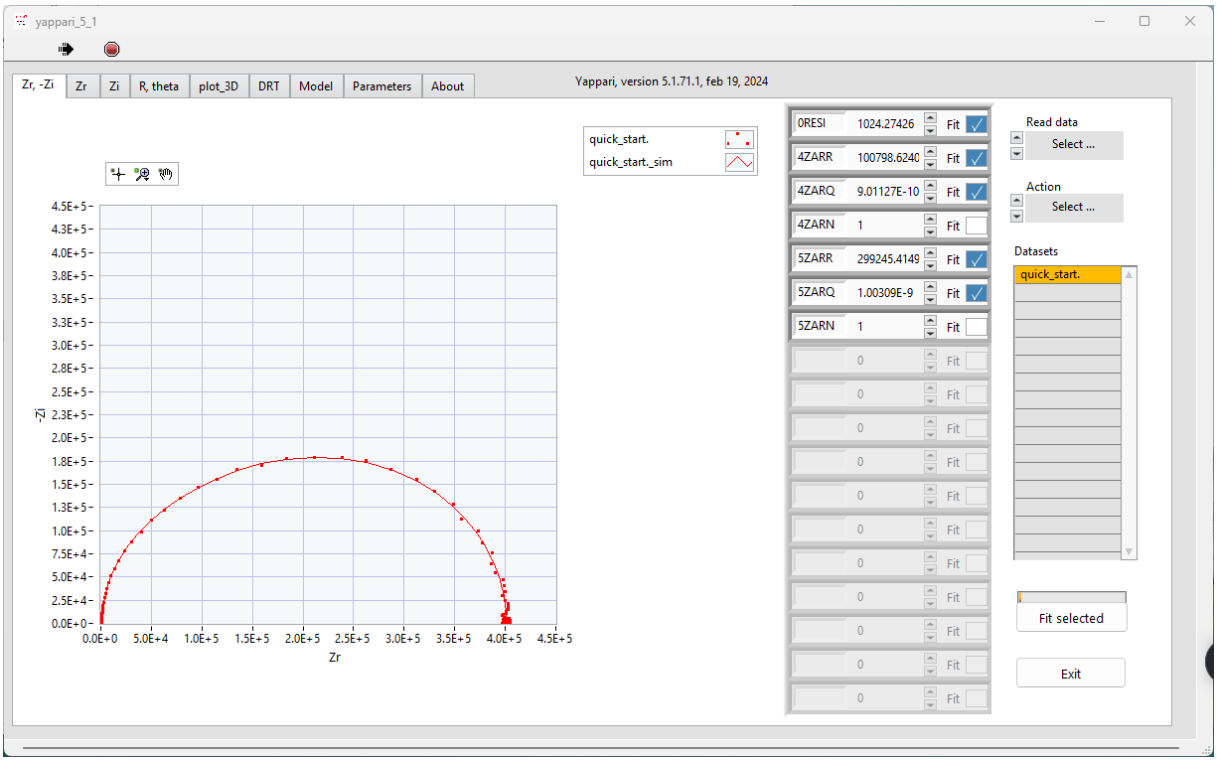
The fit is quite good, but if we inspect the plots we see a difference of about 1KOhm at high frequency.

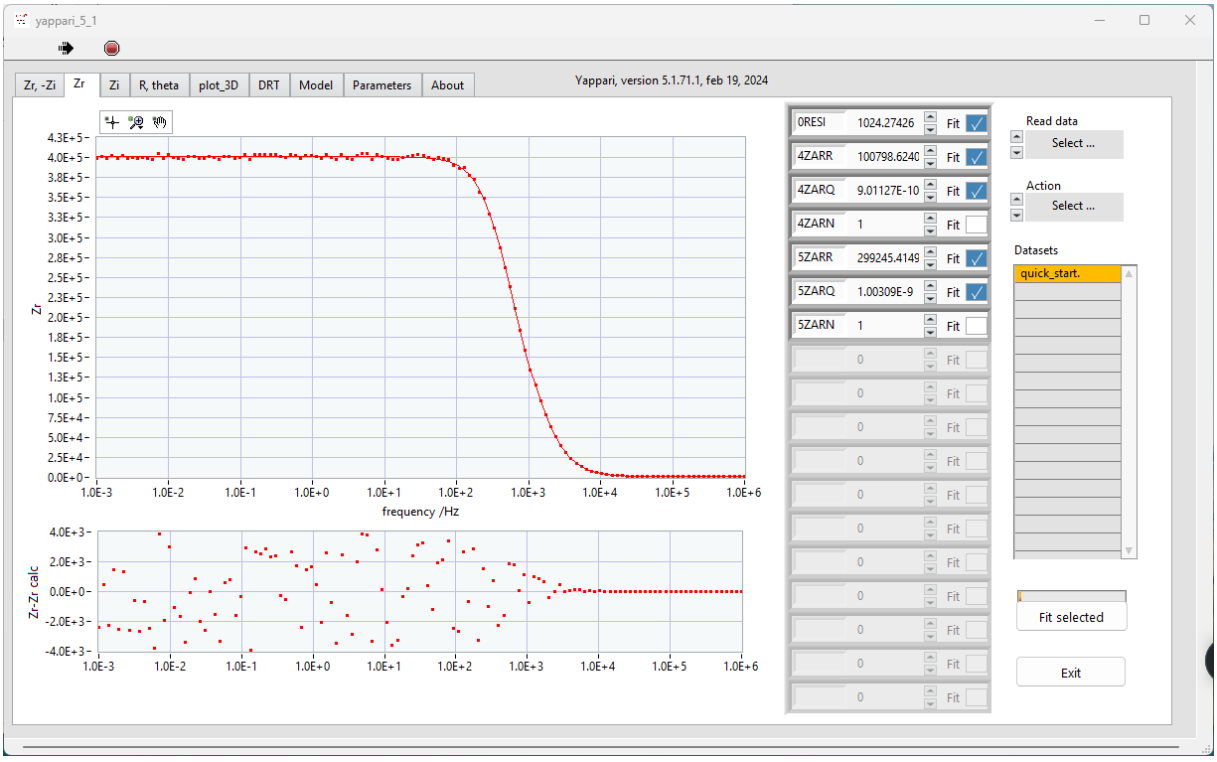


That means a resistor is missing from the circuit, let's change the model (note that changing the model resets all the parameters):



A new fit is much better:

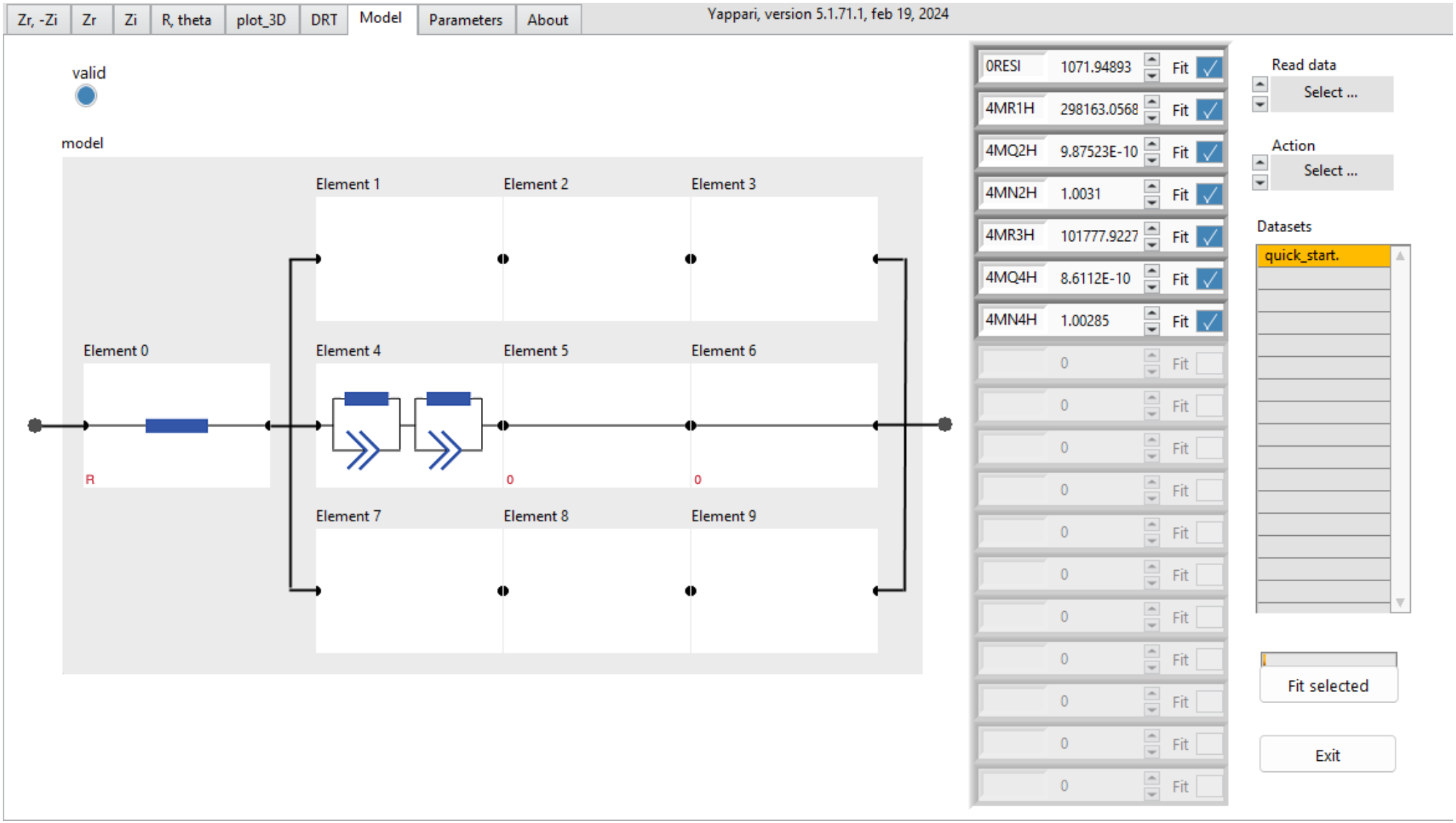




With these parameters we change the fitting to LM (unconstrained NLLS) so as to obtain proper esd values. Then we can save a pdf report file which I'll add in the following.

Yappari

samedi 17 février 2024, 21:56:33



All parameters :
0RESI: 1.07195E+3, 4MR1H: 2.98163E+5, 4MQ2H: 9.87523E-10, 4MN2H: 1.00310E+0, 4MR3H: 1.01778E+5, 4MQ4H: 8.61120E-10, 4MN4H: 1.00285E+0,

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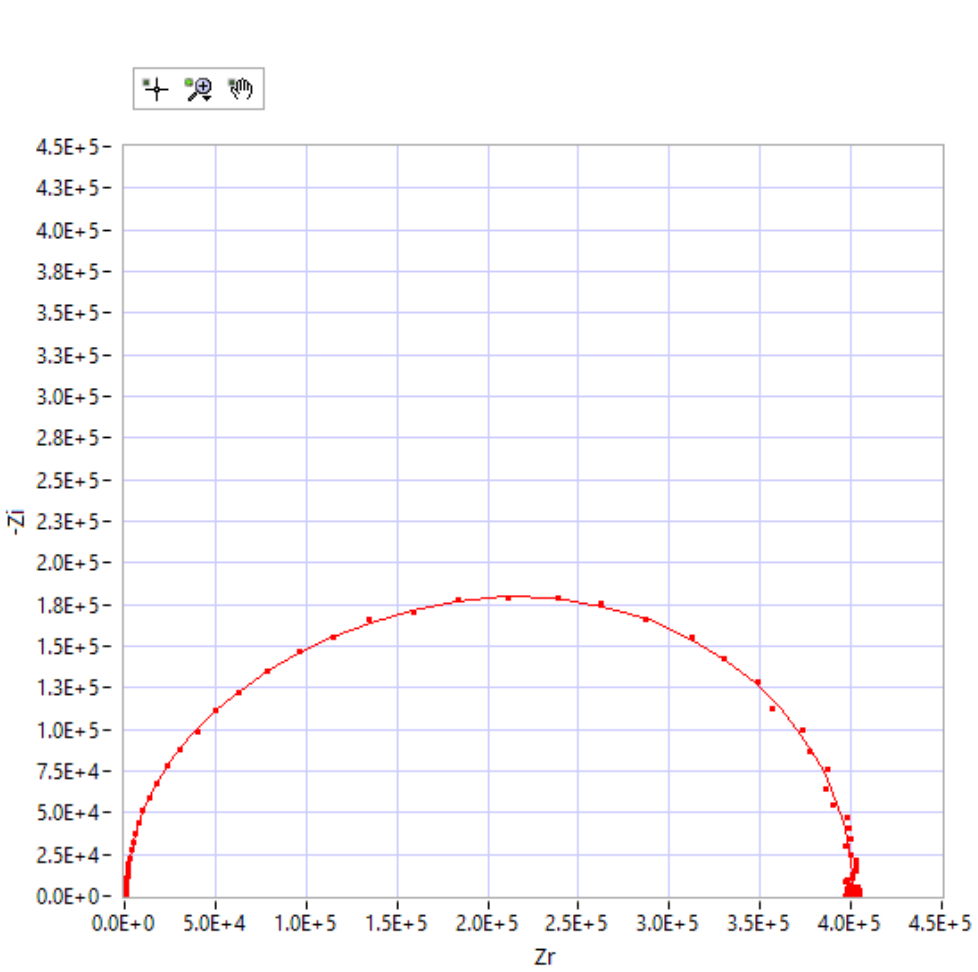
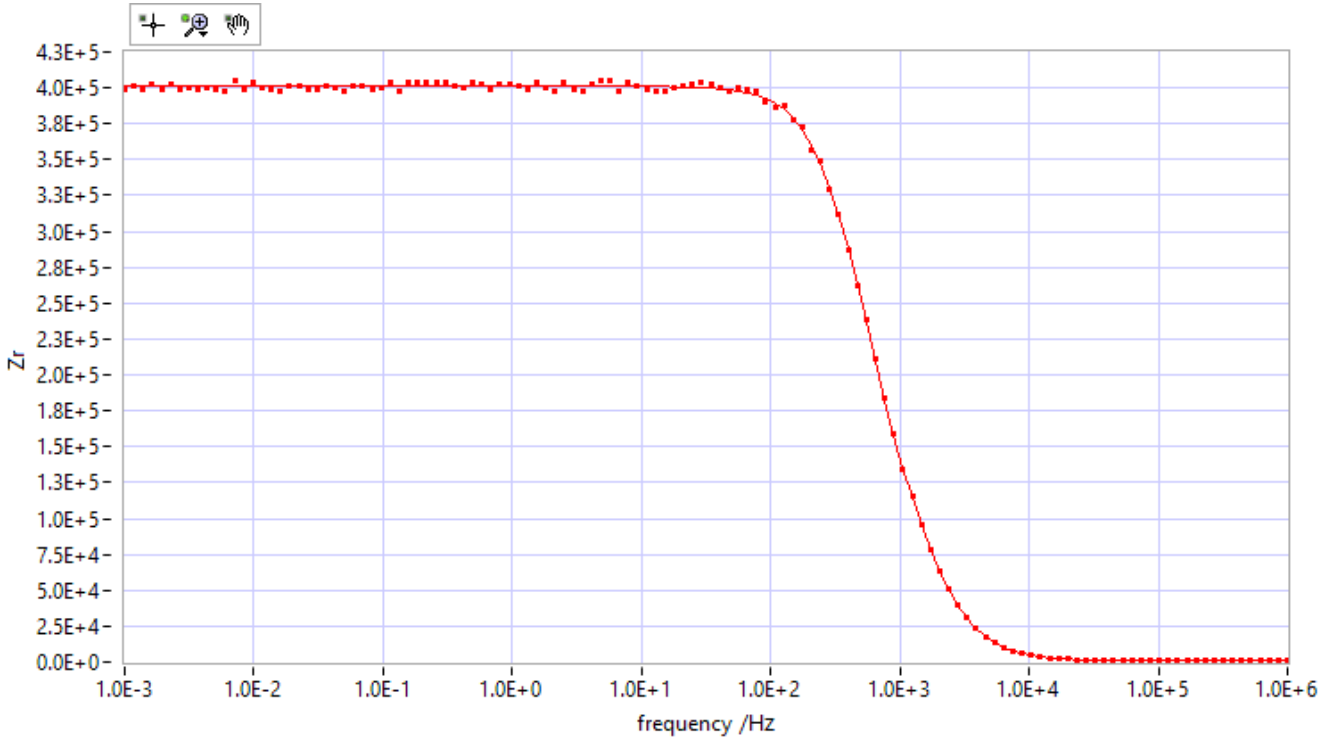
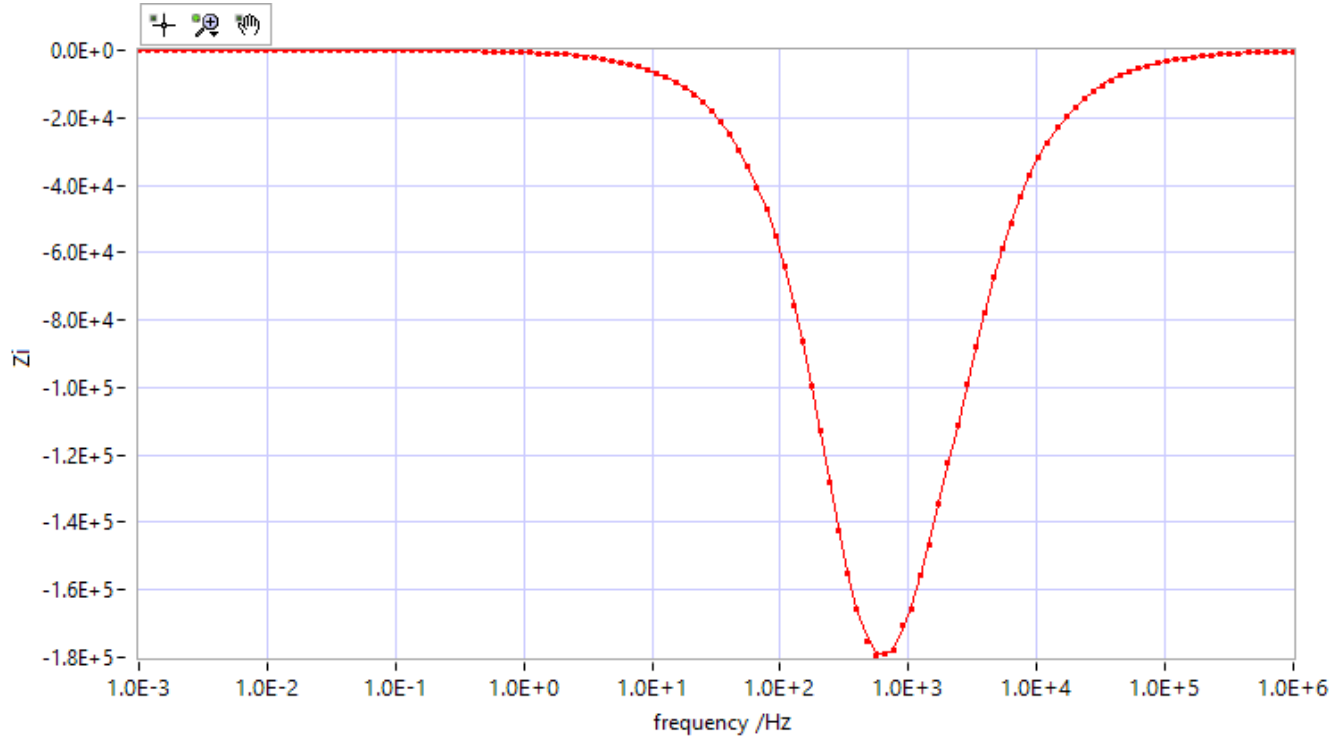
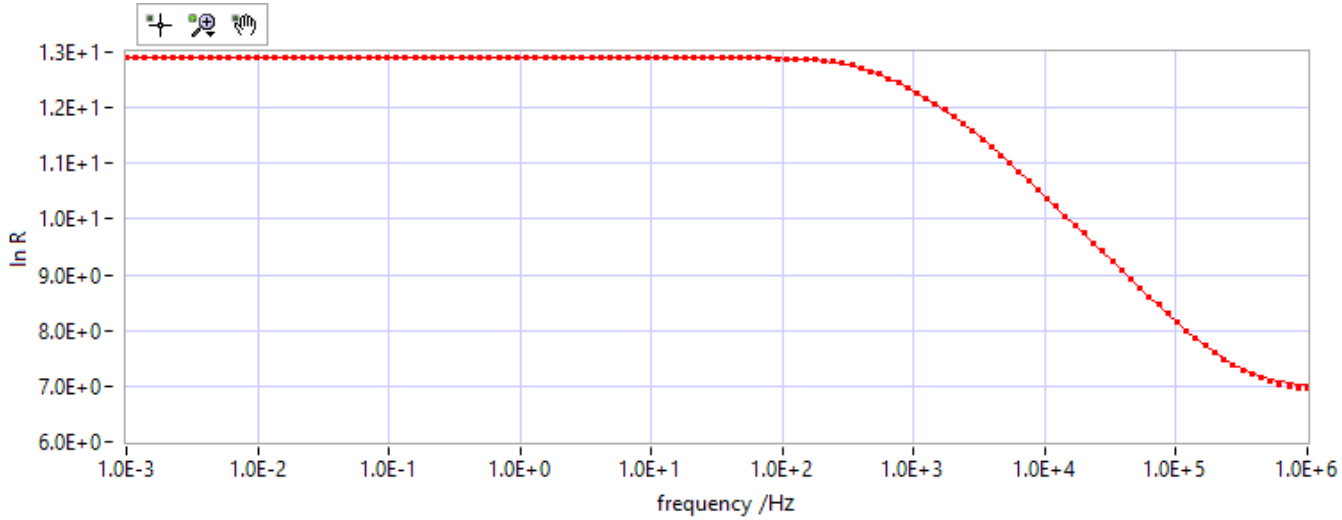
Dataset name : quick_start.
Fitted parameters and calculated standard error :
0RESI 1.072E+3 +/- 2.69E+2
4MR1H 2.982E+5 +/- 1.34E+4
4MQ2H 9.875E-10 +/- 3.83E-11
4MN2H 1.003E+0 +/- 5.08E-3
4MR3H 1.018E+5 +/- 1.34E+4
4MQ4H 8.611E-10 +/- 9.46E-11
4MN4H 1.003E+0 +/- 1.59E-2

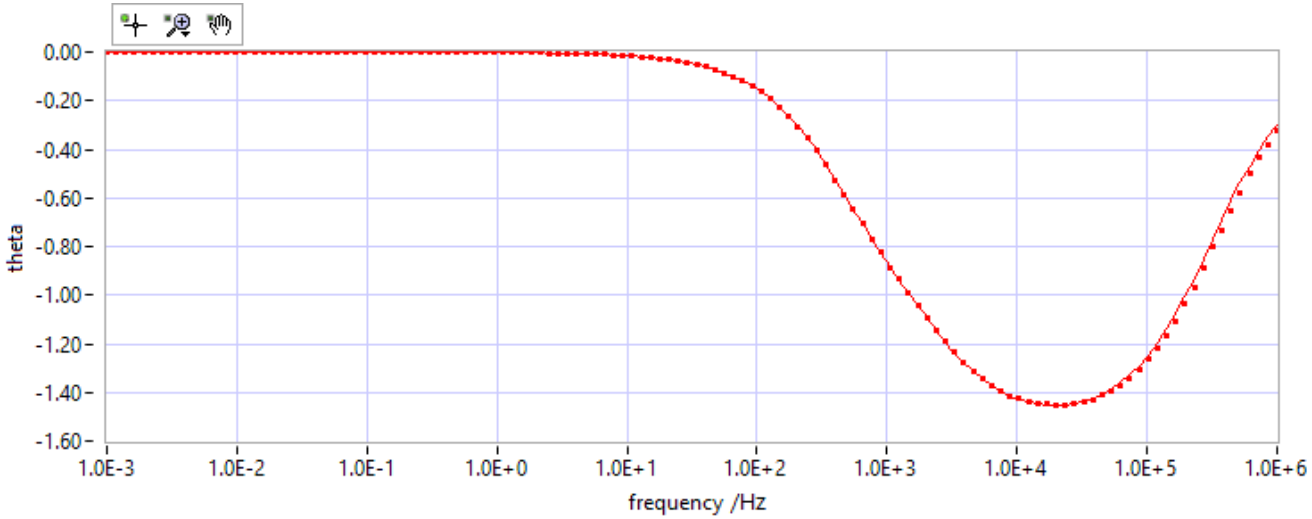
R square: 9.999541E-1
Chi square: 5.596510E+0


quick_start.
quick_start._sim
4.5E+5
4.3E+5
4.0E+5
3.8E+5
3.5E+5
3.3E+5
3.0E+5
2.8E+5
2.5E+5
2.3E+5
2.0E+5
1.8E+5
1.5E+5
1.3E+5
1.0E+5
7.5E+4
5.0E+4
2.5E+4
0.0E+0
-Zi
0.0E+0
5.0E+4
1.0E+5
1.5E+5
2.0E+5
2.5E+5
3.0E+5
3.5E+5
4.0E+5
4.5E+5
Zr


4.3E+5
4.0E+5
3.8E+5
3.5E+5
3.3E+5
3.0E+5
2.8E+5
2.5E+5
2.3E+5
2.0E+5
1.8E+5
1.5E+5
1.3E+5
1.0E+5
7.5E+4
5.0E+4
2.5E+4
0.0E+0
Zr
1.0E-3
1.0E-2
1.0E-1
1.0E+0
1.0E+1
1.0E+2
1.0E+3
1.0E+4
1.0E+5
1.0E+6
frequency /Hz


0.0E+0
-2.0E+4
-4.0E+4
-6.0E+4
-8.0E+4
-1.0E+5
-1.2E+5
-1.4E+5
-1.6E+5
-1.8E+5
Zi
1.0E-3
1.0E-2
1.0E-1
1.0E+0
1.0E+1
1.0E+2
1.0E+3
1.0E+4
1.0E+5
1.0E+6
frequency /Hz


1.3E+1
1.2E+1
1.1E+1
1.0E+1
9.0E+0
8.0E+0
7.0E+0
6.0E+0
ln R
1.0E-3
1.0E-2
1.0E-1
1.0E+0
1.0E+1
1.0E+2
1.0E+3
1.0E+4
1.0E+5
1.0E+6
frequency /Hz


0.00
-0.20
-0.40
-0.60
-0.80
-1.00
-1.20
-1.40
-1.60
theta
1.0E-3
1.0E-2
1.0E-1
1.0E+0
1.0E+1
1.0E+2
1.0E+3
1.0E+4
1.0E+5
1.0E+6
frequency /Hz