

Matlab Fitting Script

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github.com/giumc/ResonatorFittingGM

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@gumc Fixes for gumc fork	play	
@resonator	Fixes for gumc fork	
@resonator_folder	Fixes for gumc fork	2 minutes ago
LICENSE	Fixes for gumc fork	2 minutes ago
README.md	Fixes for gumc fork	2 minutes ago

It contains two MATLAB classes:

- 1) resonator
- 2) resonator_folder

Once you add the folder to your path , you're good to go

Basic functionality of @resonator:

Code

r=resonator

r=resonator(path)

r =

resonator with properties:

```
touchstone_file: 'P1AL1BL2C1FL1AW1.s1p'  
    tag: 'P1AL1BL2C1FL1AW1'  
    save_folder: 'C:\Users\giuse\Google  
Drive\Measures\Mika_chip\'  
    max_modes: 10.0000e+000  
    sparam: [1×1 sparameters]  
    y_meas: [13667×1 double]  
    data_table: []  
    outputfiles: []  
    y_calc: [13667×1 double]
```

Explanation

prompt UI to select a .s1p or .s2p

uses path to generate a resonator object

object visible properties

Resonator touchstone

Name

Location of saved data

Max modes that will be fitted

Sparam array

Equivalent admittance

Table with data (still empty)

Output files (still empty)

Fitted admittance (for now to default values)

Basic functionality of @resonator:

Code

Explanation

```
>> methods(r)
```

Methods for class resonator:

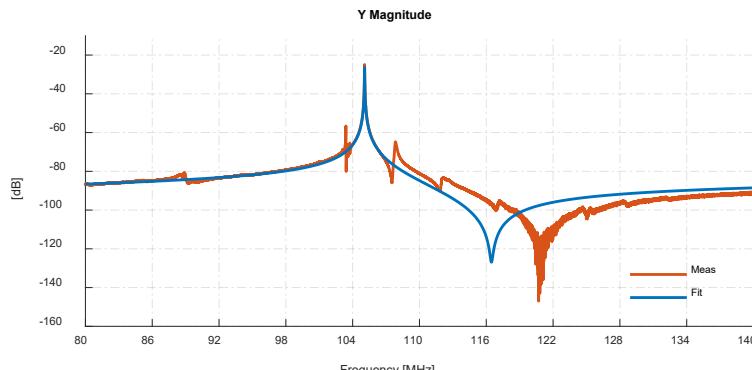
copy	fit_routine	reset
delete	gen_table	resonator
delete_gui	guess_coarse	save
fit_all_modes	prompt_touchstone	setup_gui

Methods of resonator inherited from handle.

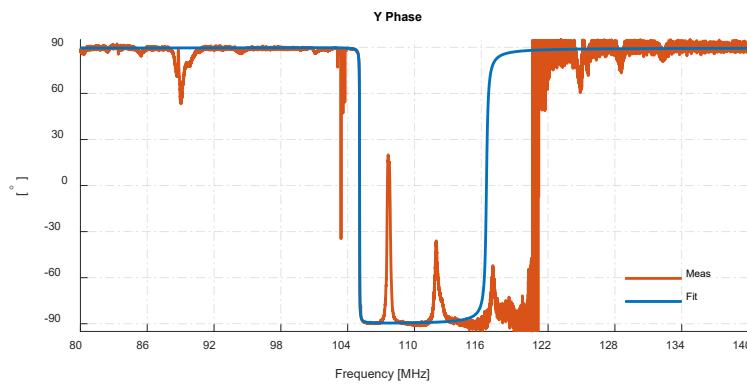
```
>>
```

Code

```
>> r.setup_gui
```



Param	Value	Min	Control	Max	O
C0	60.3f	12.1f		301.6f	
R0	2.4M	479.8k		12.0M	
Rs	2.0	400.0m		10.0	
Fres_1	105.1M	21.0M		525.4M	
Q_1	5.9k	1.2k		29.5k	
kt2_1	282.0m	56.4m		1000.0m	



Add Mode	Remove Mode	Rescale Boundaries
Start Fit	Stop Fit	OptimizeAll
Reset	Guess Shape	Save

For single resonator fit, this is a good tool:

- You can check in real time the fitted values
- You can see in real time the optimizer running
- You can add / remove modes (the script finds the location and then optimizes Q and kt2)
- You can activate/deactivate optimizable variables
- You can reset the data in case you do weird stuff
- You can save data when you're done

Code

```
>> r.fit_routine
```



Code

```
>> help r.save  
--- help for resonator/save ---
```

by default, it saves png and .m file
in the same folder as the s2p file

pass as many options as you need:

'png' to print png

'fig' to print eps and fig file

'tab' to print table

'full' to print png,eps,fig,csv and mat file with res
data

'data' to save only .m data file

OSS:

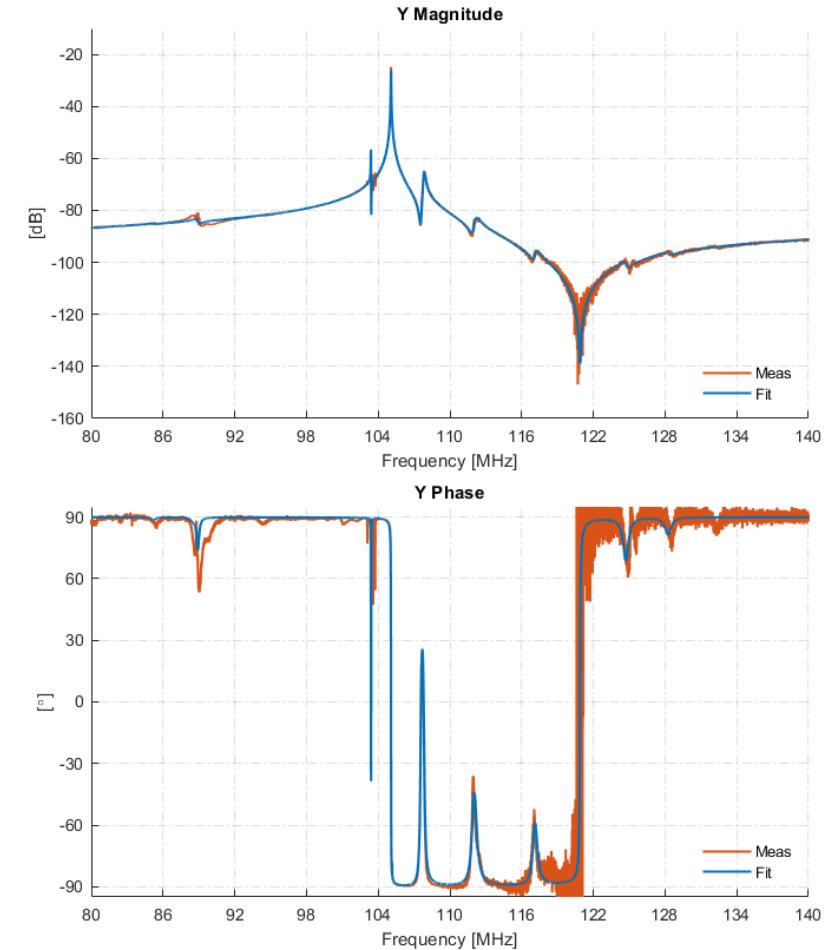
pass extra arguments to setup_gui() as follows:

'guioptions','opt1','opt2',... as last arguments

>>

```
>> r.save('full','guioptions','minimal')Saving  
R3C5_80MHz_140MHz_Pm20dB_vacuum resonator data
```

Fit Result		
Name	Date modified	Type
R3C5_80MHz_140MHz_Pm20dB_vacuum.csv	6/8/2020 5:37 PM	Microsoft Excel
R3C5_80MHz_140MHz_Pm20dB_vacuum.eps	6/8/2020 5:37 PM	EPS File
R3C5_80MHz_140MHz_Pm20dB_vacuum.fig	6/8/2020 5:37 PM	MATLAB Figure
R3C5_80MHz_140MHz_Pm20dB_vacuum.mat	6/8/2020 5:37 PM	MATLAB Data



Basic functionality of @resonator_folder:

Code

```
>> properties(rf)
```

Properties for class resonator_folder:

resonators
max_modes
folder

```
>> methods(rf)
```

Methods for class resonator_folder:

Filter inspect read_all save_all
fit_all prompt_folder resonator_folder

Methods of resonator_folder inherited from handle.

```
>>
```

Basic functionality of @resonator_folder:

Code

```
>> rf=resonator_folder
```

```
rf =
```

resonator_folder with properties:

resonators: [0x0 resonator]

max_modes: 10.0000e+000

folder: []

```
>> rf.prompt_folder
```

```
>> rf.read_all
```

```
>> rf.fit_all
```

Explanation

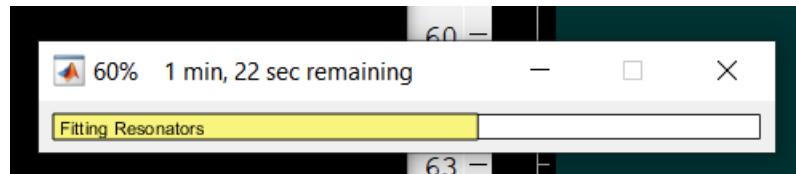
Initialize object

(if 'prompt' is passed, opens UI to get folder)

Ui to get folder

Initialize all resonators in folder

Fit all resonators (with r.fit_routine)



Code

```
>> help rf.save_all  
--- help for resonator_folder/save_all ---
```

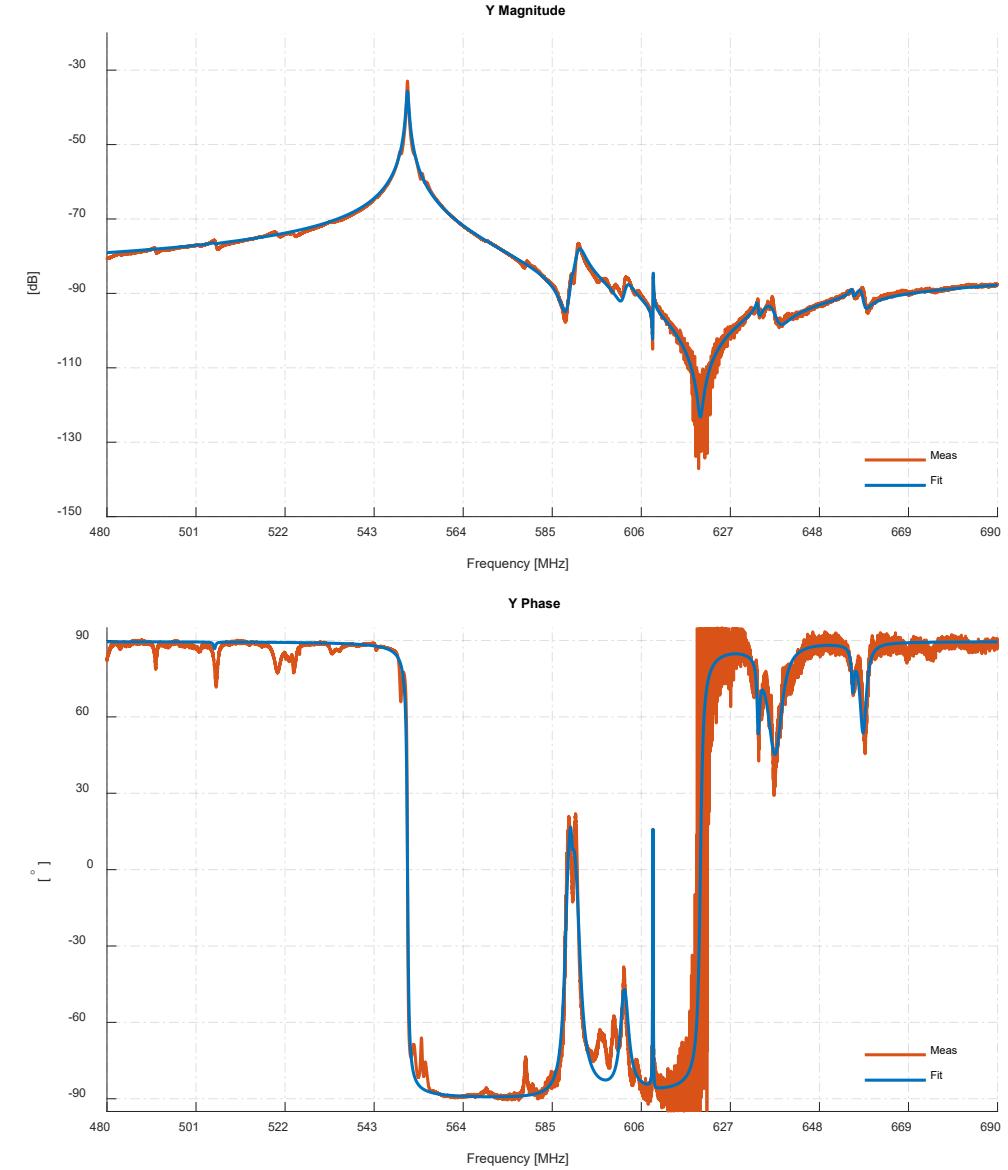
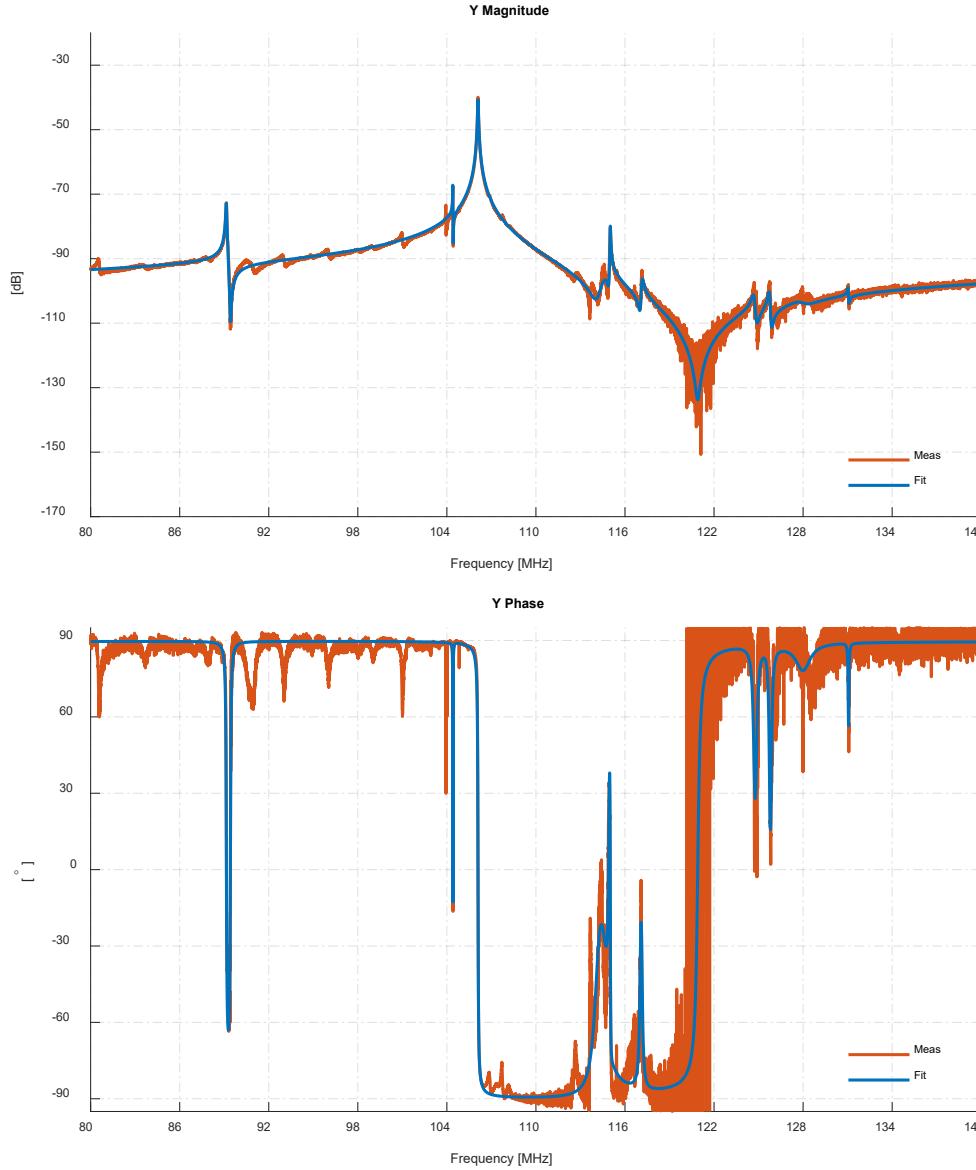
creates a folder (with tag specified in rf.tag)
with a csv and a .m with all resonator in folder
you can pass extra options to get more formatted data:
'png' makes a folder BitmapImages with a .png of all
resonators
'fig' makes a folder VectorImages with a .eps of all
resonators
'data' makes a folder ResData with a .mat of all
resonators
moreover, you can pass options to resonator.save as
'guioptions','opt1','opt2' to control extra figure options

es: save all resonators png with minimal setup
`r.save_all('png','guioptions','minimal','Visible','off');`
---- for list of options, help resonator.save ---

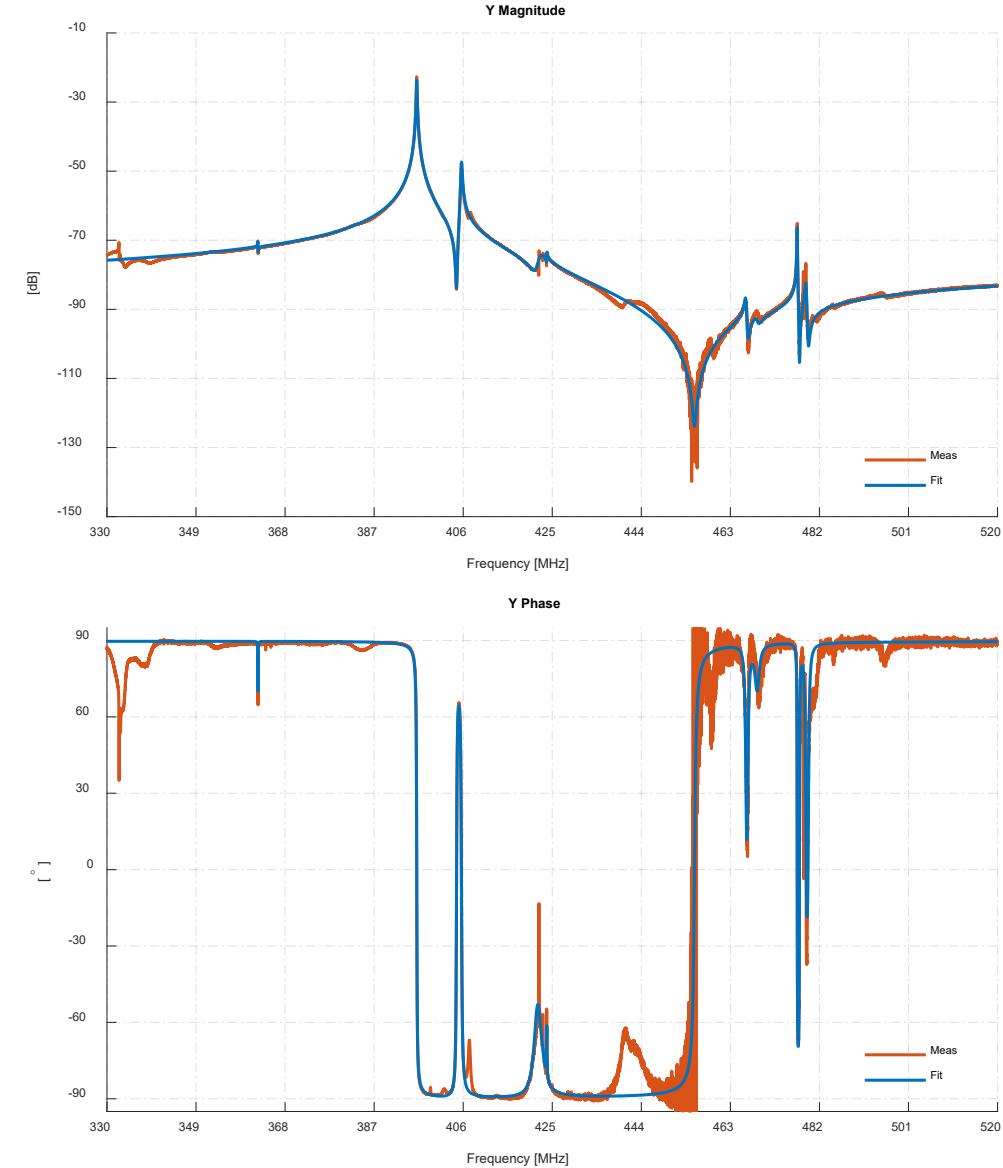
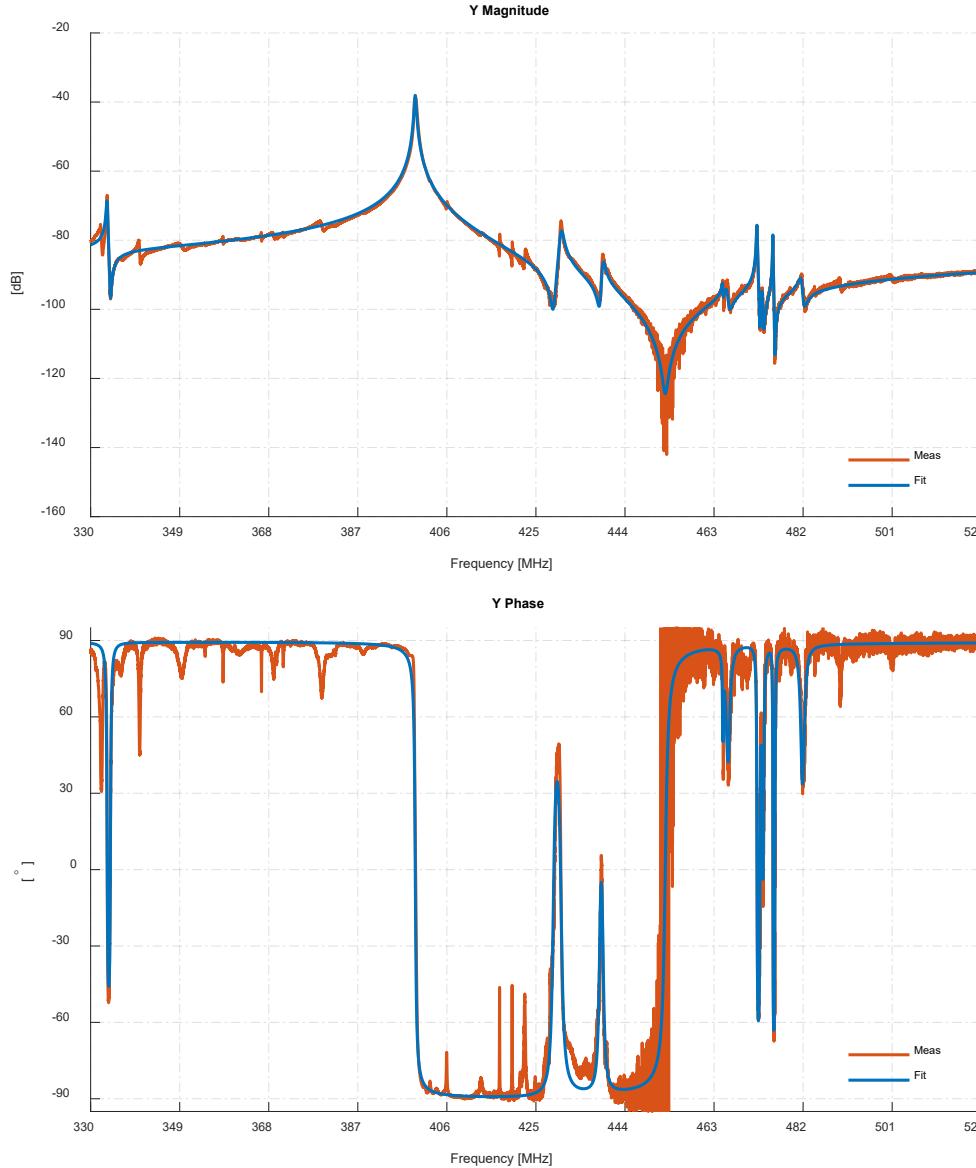
Explanation

Help is your friend (I Hope!)

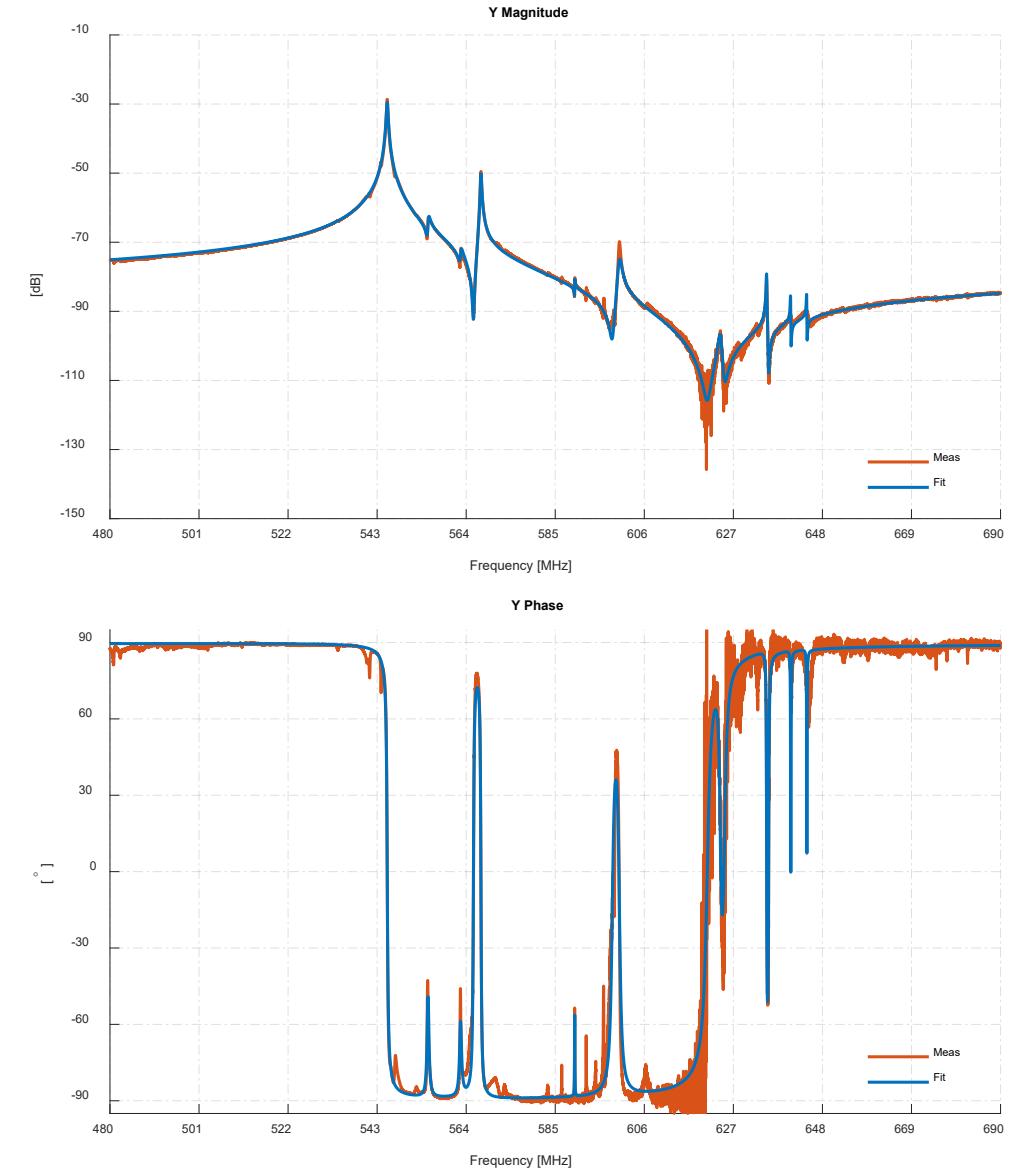
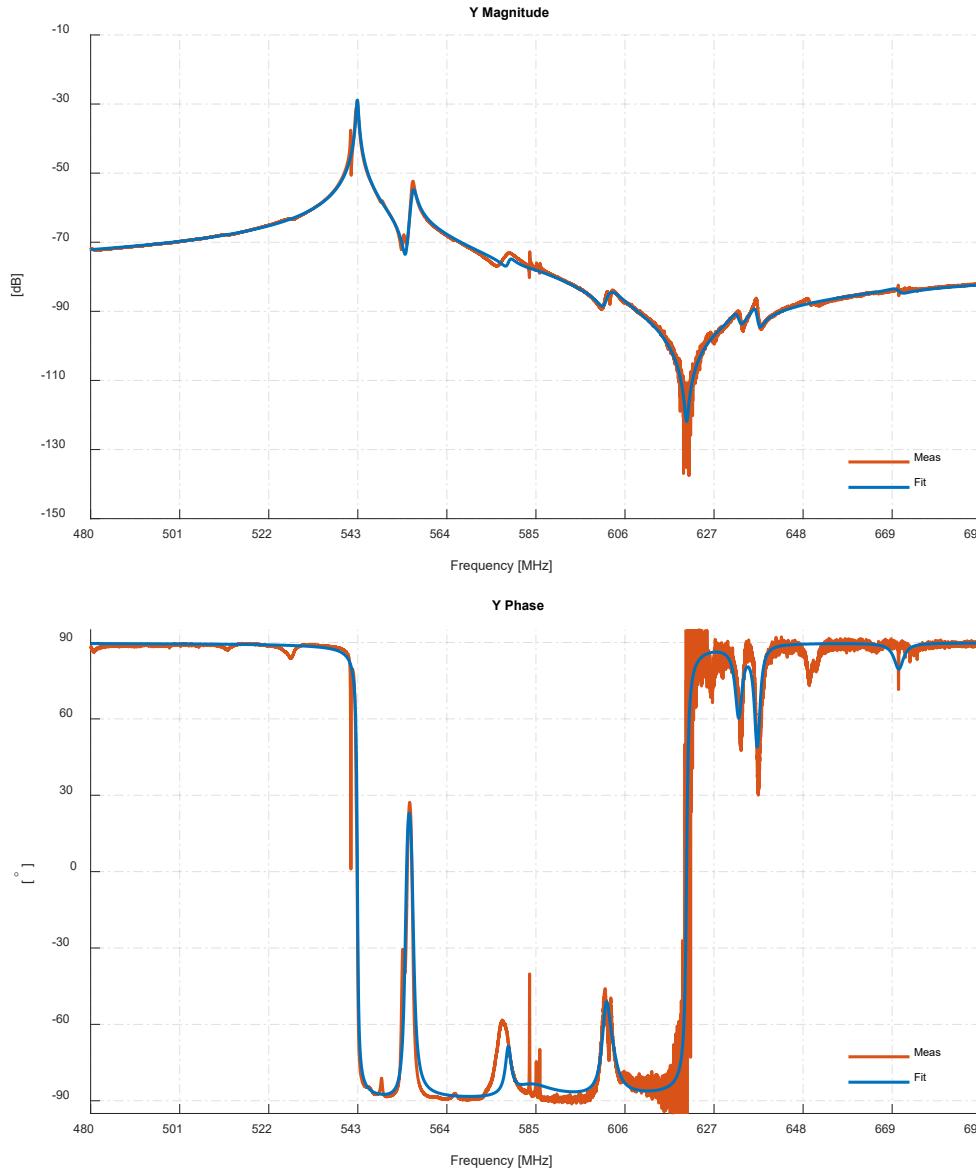
some examples of automatically fitted linbo_3 resonators (up to 10 spurious)



some examples of automatically fitted linbo₃ resonators (up to 10 spurious)



some examples of automatically fitted linbo_3 resonators (up to 10 spurious)



some examples of automatically fitted linbo_3 resonators (up to 10 spurious)

(first three modes)

Resonator	C0	R0	Rs	Fres_1	Q_1	kt2_1	Fres_2	Q_2	kt2_2	Fres_3	Q_3	kt2_3
R10C17_480MHz_690MHz_Pm20dB_vacuum.s2p	3.53E-14	1.54E+09	27.79746	5.43E+08	881627.5	0.319595	5.56E+08	451.4289	0.039017	6.37E+08	413.7168	0.000376
R10C1_480MHz_690MHz_Pm20dB_vacuum.s2p	1.79E-14	4350872	60.69597	5.51E+08	1111328	0.306737	5.91E+08	244.9272	0.008562	6.09E+08	6390.303	0.000146
R11C14_480MHz_690MHz_Pm20dB_vacuum.s2p	2.60E-14	927749.3	0.759242	5.45E+08	1474.649	0.322079	5.67E+08	2026.92	0.020263	6.35E+08	4057.622	0.000311
R12C18_330MHz_520MHz_Pm20dB_vacuum.s2p	1.82E-14	2050300	79.94549	3.99E+08	6457843	0.334254	4.72E+08	2637.488	0.001413	4.76E+08	4800.789	0.000562
R13C16_330MHz_520MHz_Pm20dB_vacuum.s2p	3.86E-14	2034496	15.43641	3.96E+08	8798262	0.350854	4.77E+08	5658.717	0.000906	4.06E+08	1607.785	0.035316
R2C5_80MHz_140MHz_Pm20dB_vacuum.s2p	2.47E-14	8736343	108.9595	1.06E+08	7279134	0.337163	1.15E+08	2697.622	0.00237489142500	1359.206	0.015201	