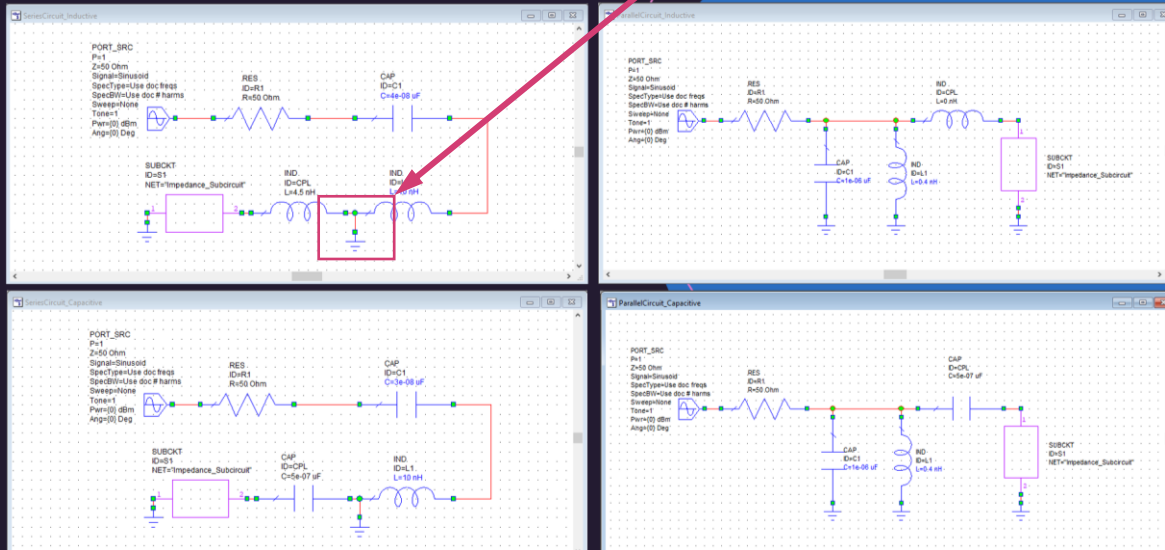


# LC Circuit:

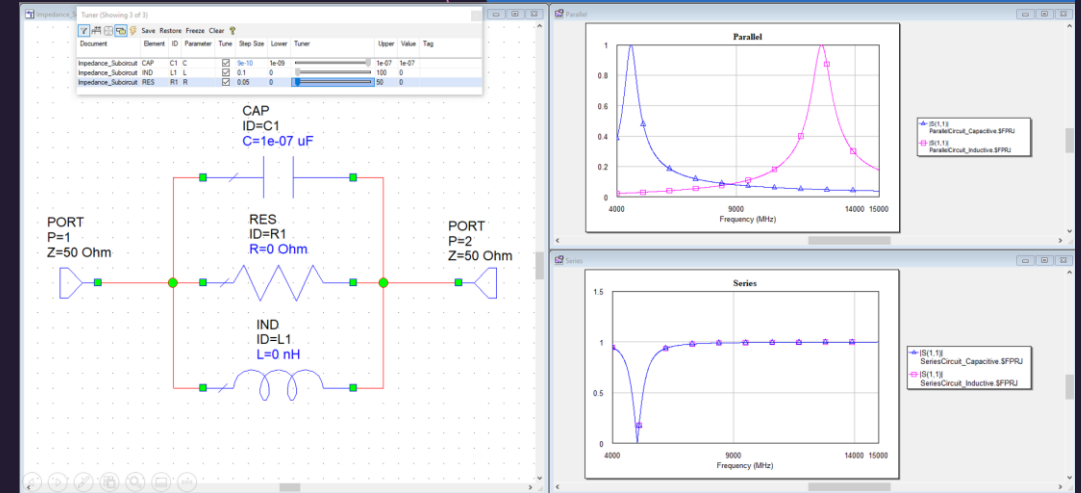
Maximizing sensitivity of the circuit, deluxe edition

# Last Time

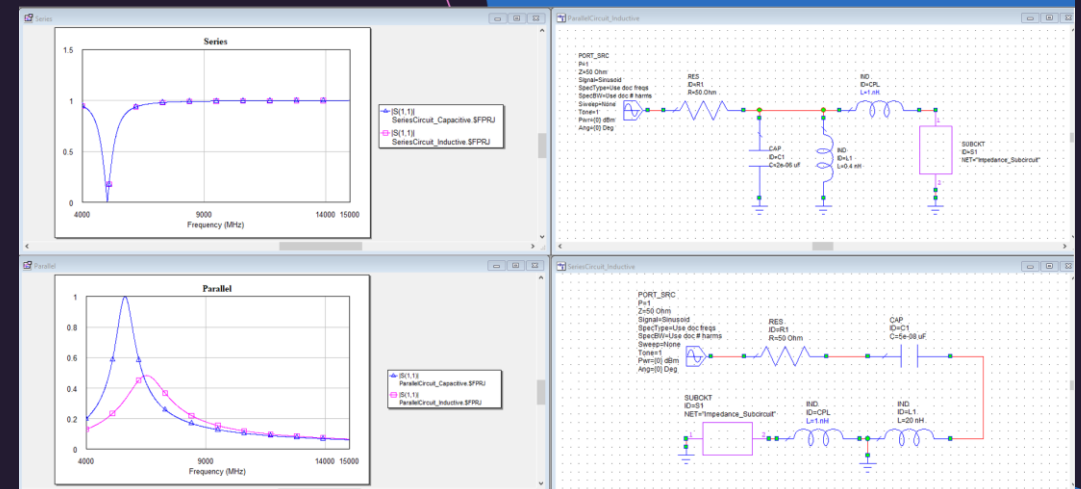
## Some Changes



Let's mess with the impedance: Low resistance



Let's adjust coupling strength: inductance



This time...

## Decisions, Decisions...

Python? COM API <-> C++?

~~Scripting in AWR (VBA)?~~

# MWR SDE (VBA Scripting)

```
AWR Scripting - [ResonatorSiO2box.emp - Module1 (Code)]
File Edit View Insert Debug Run Help
Project Global
  Object Modules
    ThisProject (Th
  Code Modules
    ResonatorSiO2box.emp
    Object Modules
      ThisProject
    Code Modules
      Module1
Immediate
Object: [General] Proc: Main
Sub Main
  ' Seeking for Elements and Parameters that are tuneable
  Debug.Clear
  Dim sch As Schematic
  Dim ele As Element
  Dim par As Parameter
  Dim L As Double
  Dim C As Double
  Dim res_freq As Long
  Dim series As Boolean
  L = CDB1(0)
  C = CDB1(0)

  For Each sch In Project.Schematics
    If sch.Name <> "Inductor_Subcircuit" Then
      ' Debug.Print "Looking in ";sch.Name

      'Checking if it's a series circuit or not
      If sch.Name Like "Series*" Then
        series = True
      Else
        series = False
      End If
      ' Debug.Print "series is ";series," for ";sch.Name;"."

      For Each ele In sch.Elements

        If ele.Name <> "PORT_SRC.P1" And ele.Name <> "SUBCKT.S1" And ele.Name <> "GND" And ele.Name <> "RES.R1" Then
          'And ele.Name <> "IND.CPL" And ele.Name <> "CAP.CPL"

          For Each par In ele.Parameters
            Debug.Print "Looking at ";sch.Name;".";ele.Name;".";par.Name;"."
            SetOptimize(par)

            Dim c_and_l
            c_and_l = SetCAndL(par, C, L)
            C = c_and_l(0)
            L = c_and_l(1)

            Next par
          End If
        Next ele
      Debug.Print "L="; L; " and C="; C; "."
    End If
  End If
```

```
If L <> CDB1(0) And C <> CDB1(0) Then
  res_freq = GetResFreq(L, C)
End If
Next sch
End Sub

Function SetOptimize(par As Parameter)
'Sets Optimize boolean for each parameter we want to change
' Debug.Print "Looking at "; ele.Name

If par.Name = "C" Or par.Name = "L" Then
  Debug.Print "Setting Optimize to true."
  par.Optimize = True

Else
  par.Optimize = False
End If
End Function

Function SetCAndL(par As Parameter, C, L)
Dim cap As Double
cap = CDB1(0)
Dim ind As Double
ind = CDB1(0)

If par.Name = "C" Then
  Debug.Print par.Name; ".ValueAsDouble="; par.ValueAsDouble
  cap = par.ValueAsDouble + C
End If

If par.Name = "L" And L <> CDB1(0) Then
  Debug.Print par.Name; ".ValueAsDouble="; par.ValueAsDouble
  ind = 1.0/((1.0/par.ValueAsDouble) + (1.0/L))

ElseIf par.Name = "L" Then
  Debug.Print par.Name; ".ValueAsDouble="; par.ValueAsDouble
  ind = par.ValueAsDouble
End If
SetCAndL = Array(CDB1(cap), CDB1(ind))
End Function

Function SetL(par As Parameter, L)
Dim ind As Double
ind = CDB1(0)

If par.Name = "L" And L <> CDB1(0) Then
  Debug.Print par.Name; ".ValueAsDouble="; par.ValueAsDouble
  ind = 1.0/((1.0/par.ValueAsDouble) + (1.0/L))

ElseIf par.Name = "L" Then
  Debug.Print par.Name; ".ValueAsDouble="; par.ValueAsDouble
  ind = par.ValueAsDouble
End If
SetL = CDB1(ind)
End Function

Function GetResFreq(ind As Double, cap As Double)
'Calculates the resonant frequency of the circuit, neglecting the contribution of the subcircuit inductance and capacitance
Debug.Print "Calculating resonant frequency"
GetResFreq = (1 / (Sqr(ind * cap)))
End Function

' $Menu=Graphs
Sub Derivative
Dim gs As Graphs
Set gs = Project.Graphs
Debug.Print "Hello World!"
End Sub
```

This time...

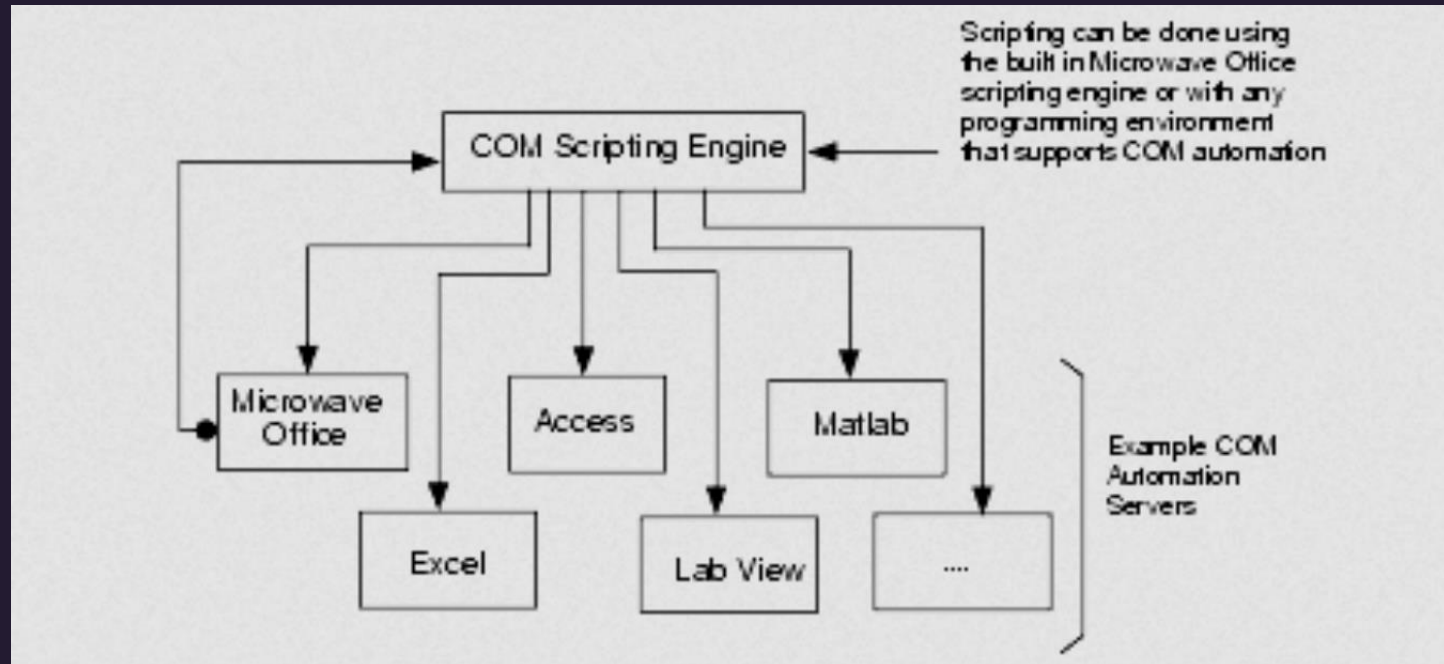
Decisions,  
Decisions...

Python? COM API <-> C++?

# C++ through COM API

- This is a good option, but there's a big overhead.
- I would need to invest a good amount of time to write efficient and memory-safe C++.
- It's probably not worth investing time into\* *right now*

**Component Object Model (COM)** is a binary-interface standard for software components introduced by Microsoft in 1993. It is used to enable inter-process communication object creation in a large range of programming languages.



This time...

Decision,  
Decision

Python...?