

HFSS 建模與計算(2)

- 7. 定義Project variables
- 8. 在模型中加入變數
- 9. 進行調整參數的計算
- 10. 調整輸出數據

7.1 在Project點選Project Variables

ANSYS Electronics Desktop - dipole antenna - HFSSDesign1 - 3D Modeler - SOLVED - [dipole antenna - HFSSDesign1 - Modeler]

File Edit View **Project** Draw Modeler HFSS Tools Window Help

Automation

Component Librar

Properties

Name	Value
Command	Create...
Coordin...	Global
Center P...	0,0,0.5 mm 0mm, 0mm, ...
Axis	Z
Radius	0.5 mm 0.5mm
Height	50 mm 50mm
Number ...	0

Message Manager

Progress

Show project variables

Hide 0 Messages Hide Progress

上午 09:36 2018/10/5

7.2 我們要將天線長度定為變數。選擇增加Add，跳出對話框。

ANSYS Electronics Desktop - dipole antenna - HFSSDesign1 - 3D Modeler - SOLVED - [dipole antenna - HFSSDesign1 - Modeler]

File Edit View Project Draw Modeler HFSS Tools Window Help

Save Cut Copy Paste Undo Redo Select: Object Select by Name Zoom Pan Rotate Orient Fit All Fit Selected Operations Measure Visibility Snap Materials

Desktop View Draw Model Simulation Results Automation

Project Manager

- dipole antenna
 - HFSSDesign1 (DrivenModal)
 - 3D Components
 - Model
 - air
 - copper
 - Cylinder1
 - CreateCylinder
 - Boundaries
 - Excitations
 - Hybrid Regions
 - Mesh Operations
 - Analysis
 - Optimetrics
 - Results
 - Port Field Display
 - Field Overlays
 - Radiation
 - Definitions

Component Librar

- Favorites
- Most Recently U
- HFSS Componer
- Antennas
- Human Body
- Johanson
- Rectangular 1
- Surface Mou

Properties: dipole antenna

Project Variables | Intrinsic Variables | Constants

Value Optimization / Design of Experiments Tuning Sensitivity Statistics

Add Property

Name Variable Separator ArrayIndex/Variable

Unit Type: None Units:

Value: 0

Enter initial value into Value field. This should be a number, variable, or expression. Referenced project variables should be prefixed with a '\$'. Examples: 22.4pF, \$C1, 2*cos(\$X).

OK Cancel

Show Hidden

Add... Add Array... Edit... Remove

Name	Value	Unit	Eval
Command	Create...		
Coordin...	Global		
Center P...	0, 0, 0.5	mm	0mm
Axis	Z		
Radius	0.5	mm	0.5m
Height	50	mm	50m
Number ...	0		0

Command

0 45 90 (mm)

Message Manager Progress

Ready

Hide 0 Messages Hide Progress

上午 09:37 2018/10/5

7.3 輸入自定變數名稱length。Unit type為Length，Unit: mm，Value 50

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna model. The 'Add Property' dialog box is open, showing the configuration for a new property named 'length'. The 'Unit Type' is set to 'Length' and the 'Units' are set to 'mm'. The 'Value' field contains '50'. The dialog also includes options for 'Variable', 'Separator', and 'ArrayIndex/Variable', and a 'Show Hidden' checkbox.

The background shows the 3D model of the dipole antenna with a coordinate system (X, Y, Z). The 'Project Manager' on the left shows the hierarchy of the model, including 'HFSSDesign1 (DrivenModal)' and 'Cylinder1'. The 'Properties' panel at the bottom left shows a table of properties for the selected object.

Name	Value	Unit	Eval
Command	Create...		
Coordin...	Global		
Center P...	0,0,0.5	mm	0mm
Axis	Z		
Radius	0.5	mm	0.5mm
Height	50	mm	50mm
Number ...	0		0

The 'Command' window at the bottom shows the following text:

```
Command  
0 45 90 (mm)
```

7.4 確定後可以看到變數已經定義，名稱為\$length

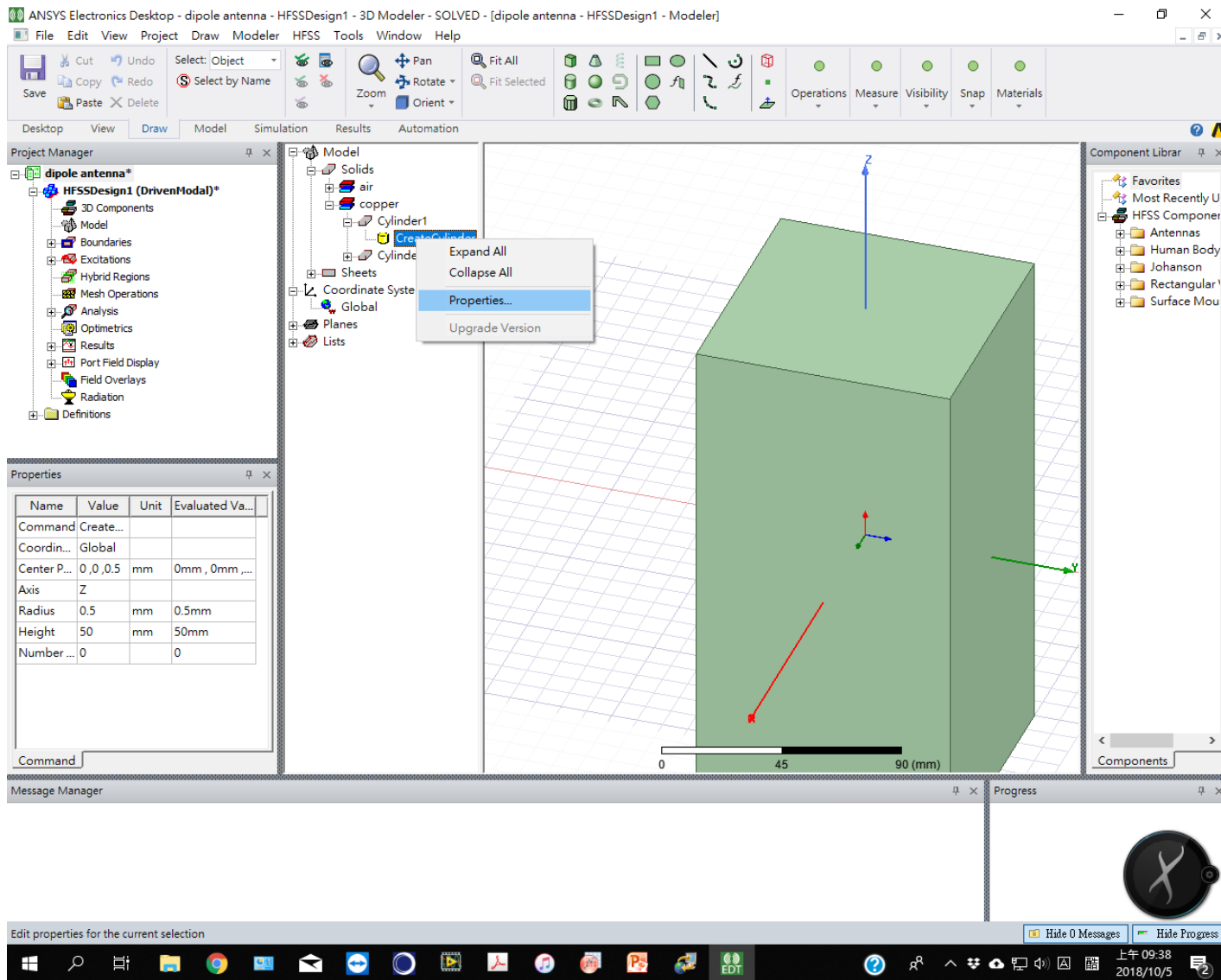
The screenshot shows the ANSYS Electronics Desktop interface. The main window displays a 3D model of a dipole antenna. A 'Properties: dipole antenna' dialog box is open, showing the 'Project Variables' tab. The dialog contains a table of project variables:

Name	Value	Unit	Evaluated Va...	Description	Read-only	Hidden	Sweep
Length	50	mm	50mm		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Below the table are buttons for 'Add...', 'Add Array...', 'Edit...', and 'Remove'. A 'Show Hidden' checkbox is also present. At the bottom of the dialog are buttons for '確定' (OK), '取消' (Cancel), and '套用(A)' (Apply).

The background interface includes the Project Manager, Component Library, and various toolbars. The Windows taskbar at the bottom shows the system tray with the date and time: 上午 09:38, 2018/10/5.

8.1 將模型長度改為變數。在圖形物件上按右鍵，修改properties



The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna model. The main 3D view shows a green rectangular block with a blue Z-axis arrow. A context menu is open over a cylinder, with the 'Properties...' option selected. The Properties panel is visible, showing the following table:

Name	Value	Unit	Evaluated Va...
Command	Create...		
Coordin...	Global		
Center P...	0,0,0.5	mm	0mm, 0mm, ...
Axis	Z		
Radius	0.5	mm	0.5mm
Height	50	mm	50mm
Number ...	0		0

The Properties panel also includes a 'Command' field at the bottom. The Project Manager on the left shows the model hierarchy, and the Component Library on the right shows various components. The bottom status bar indicates the current time is 09:38 on 2018/10/5.

8.2 天線長度為Height，將數字修改為定義的變數名稱\$length

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The 'Properties: dipole antenna - HFSSDesign1 - Modeler' dialog box is open, showing the 'CreateCylinder' command. The 'Height' property is set to '\$length' and the 'Number of ...' property is also set to '\$length'. The 'Unit' for Height is 'mm' and the 'Evaluated Value' is '50mm'. The 'Number of ...' property has an 'Evaluated Value' of '0'. The background shows a 3D model of a dipole antenna structure with a scale bar indicating 0, 45, and 90 mm.

Name	Value	Unit	Evaluated Value	Description
Command	CreateCylinder			
Coordinate ...	Global			
Center Positi...	0, 0, 0,5	mm	0mm, 0mm ...	
Axis	Z			
Radius	0.5	mm	0.5mm	
Height	\$length	mm	50mm	
Number of ...	\$length		0	

8.3 下方的圓柱也要修改：物件原點設為 0, 0, -0.5。Height修改為-\$length。

ANSYS Electronics Desktop - dipole antenna - HFSSDesign1 - 3D Modeler - [dipole antenna - HFSSDesign1 - Modeler]

File Edit View Project Draw Modeler HFSS Tools Window Help

Save Cut Copy Paste Undo Redo Delete Select: Object Select by Name

Fit All Fit Selected Pan Rotate Orient Zoom

Operations Measure Visibility Snap Materials

Desktop View Draw Model Simulation Results Automation

Project Manager

- dipole antenna*
- HFSSDesign1 (DrivenModal)*
- 3D Components
- Model
- Boundaries
- Excitations
- Hybrid Regions
- Mesh Operations
- Analysis
- Optimetrics
- Results
- Port Field Display
- Field Overlays
- Radiation
- Definitions

Model

- Solids
- air
- copper
- Cylinder1
- CreateCylinder
- Cylinder2
- CreateCylinder
- Sheets

Component Librar

- Favorites
- Most Recently U
- HFSS Componer
- Antennas
- Human Body
- Johanson
- Rectangular 1
- Surface Mou

Properties: dipole antenna - HFSSDesign1 - Modeler

Command

Name	Value	Unit	Evaluated Va...	Description
Command	CreateCylinder			
Coordinate ...	Global			
Center Positi...	0, 0, -0.5	mm	0mm , 0mm , ...	
Axis	Z			
Radius	0.5	mm	0.5mm	
Height	\$length	mm	-50mm	
Number of ...	\$length		0	

Show Hidden

確定 取消 套用(A)

Command

0 20 40 (mm)

Message Manager

- dipole antenna (C:/Users/QDL/Documents/Ansoft/)
- HFSSDesign1 (DrivenModal)
- HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 10月 05, 2018)

Ready

Hide 1 Messages Hide Progress

上午 09:39 2018/10/5

8.4 修改完properties的物件和原來一致，因為\$length的設定數值為50mm。

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna model. The main workspace shows a 3D coordinate system with X, Y, and Z axes. A vertical purple cylinder is positioned along the Z-axis. A scale bar at the bottom of the workspace indicates a length of 50 mm, with a midpoint at 25 mm.

The Project Manager on the left shows the model hierarchy:

- dipole antenna*
- HFSSDesign1 (DrivenModal)*
- 3D Components
- Model
- Boundaries
- Excitations
- Hybrid Regions
- Mesh Operations
- Analysis
- Optimetrics
- Results
- Port Field Display
- Field Overlays
- Radiation
- Definitions

The Properties panel for the selected cylinder shows the following details:

Name	Value	Unit	Evaluated Va...
Name	Cylinde...		
Material	"copper"	"copper"	
Solve Ins...	<input type="checkbox"/>		
Orientati...	Global		
Model	<input checked="" type="checkbox"/>		
Group	Model		
Display ...	<input type="checkbox"/>		
Material ...	<input type="checkbox"/>		
Color			
Transpar...	0		

The Message Manager at the bottom shows a warning: "HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 十月 05, 2018)".

The status bar at the bottom left indicates "1 object is selected".

9.1 我們希望程式改變變數數值進行計算，在Project視窗選Optimetrics: Add

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The main 3D view shows a coordinate system with red, green, and blue axes. A context menu is open over the 'Optimetrics' folder in the Project Manager, with the 'Add' option selected. The 'Add' submenu is visible, listing various optimization and analysis options. The 'Parametric...' option is highlighted.

Project Manager:

- dipole antenna*
- HFSSDesign1 (DrivenModal)*
 - 3D Components
 - Model
 - Boundaries
 - Rad1
 - Excitations
 - 1
 - Hybrid Regions
 - Mesh Operations
 - Analysis
 - Setup1
 - Sweep
 - Optimetrics
 - Results

Model:

- Solids
 - air
 - Box1
 - CreateBox
 - copper
 - Cylinder1
 - CreateCylinder
 - Cylinder2
 - CreateCylinder
- Sheets
- Coordinate Systems
 - Global
- Planes
- Lists

Optimetrics: Add Menu:

- Parametric...
- Parametric From File...
- Optimization...
- Sensitivity...
- Statistical...
- Design of Experiments...
- DesignXplorer Setup...

Message Manager:

- dipole antenna (C:/Users/QDL/Documents/Ansoft/)
- HFSSDesign1 (DrivenModal)
- HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 10月 05, 2018)

System Tray:

- Hide 1 Messages
- Hide Progress
- 上午 09:44
- 2018/10/5

9.2 設定修改數值的方式：選擇Variable:\$length，linear step: Start 25mm， Stop 75 mm， step 5mm

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The main window shows the 'Setup Sweep Analysis' dialog box, which is currently on the 'General' tab. The 'Add/Edit Sweep' sub-dialog is open, showing the following configuration:

- Variable: \$length
- Nominal value: 50mm
- Step type: Linear step
- Start: 25 mm
- Stop: 75 mm
- Step: 5 mm

The background shows the 3D model of the dipole antenna with a mesh. The 'Project Manager' on the left shows the hierarchy: dipole antenna* > HFSSDesign1 (DrivenModal)* > 3D Components > Model > Boundaries > Rad1 > Excitations > 1 > Hybrid Regions > Mesh Operations > Analysis > Setup1 > Sweep. The 'Properties' panel at the bottom left is empty. The 'Message Manager' at the bottom shows a warning: 'HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 十月 05, 2018)'. The Windows taskbar at the bottom shows the system tray with the date and time: 上午 09:44 2018/10/5.

9.3 確定後回到變數掃描列表：可以看到剛剛輸入的結果，按確定。

ANSYS Electronics Desktop - dipole antenna - HFSSDesign1 - 3D Modeler - [dipole antenna - HFSSDesign1 - Modeler]

File Edit View Project Draw Modeler HFSS Tools Window Help

Save Cut Copy Paste Undo Redo Delete Select: Object Select by Name Zoom Pan Rotate Orient Fit All Fit Selected Operations Measure Visibility Snap Materials

Desktop View Draw Model Simulation Results Automation

Project Manager

- dipole antenna*
- HFSSDesign1 (DrivenModal)*
 - 3D Components
 - Model
 - Boundaries
 - Rad1
 - Excitations
 - 1
 - Hybrid Regions
 - Mesh Operations
 - Analysis
 - Setup1
 - Sweep
 - Optimetrics
 - Results
 - S Parameter Plot 1
 - dB(S(1,1))

Properties

Component Librar

- Favorites
- Most Recently U
- HFSS Componer
 - Antennas
 - Human Body
 - Johanson
 - Rectangular
 - Surface Mou

Components

Setup Sweep Analysis

Sweep Definitions | Table | General | Calculations | Options

Sync #	Variable	Description
	length	Linear Step from 25mm to 75mm, step=5mm

Add... Edit... Delete

Sync UnSync

Operation Description

Edit Variables HPC and Analysis Options... 確定 取消

Message Manager

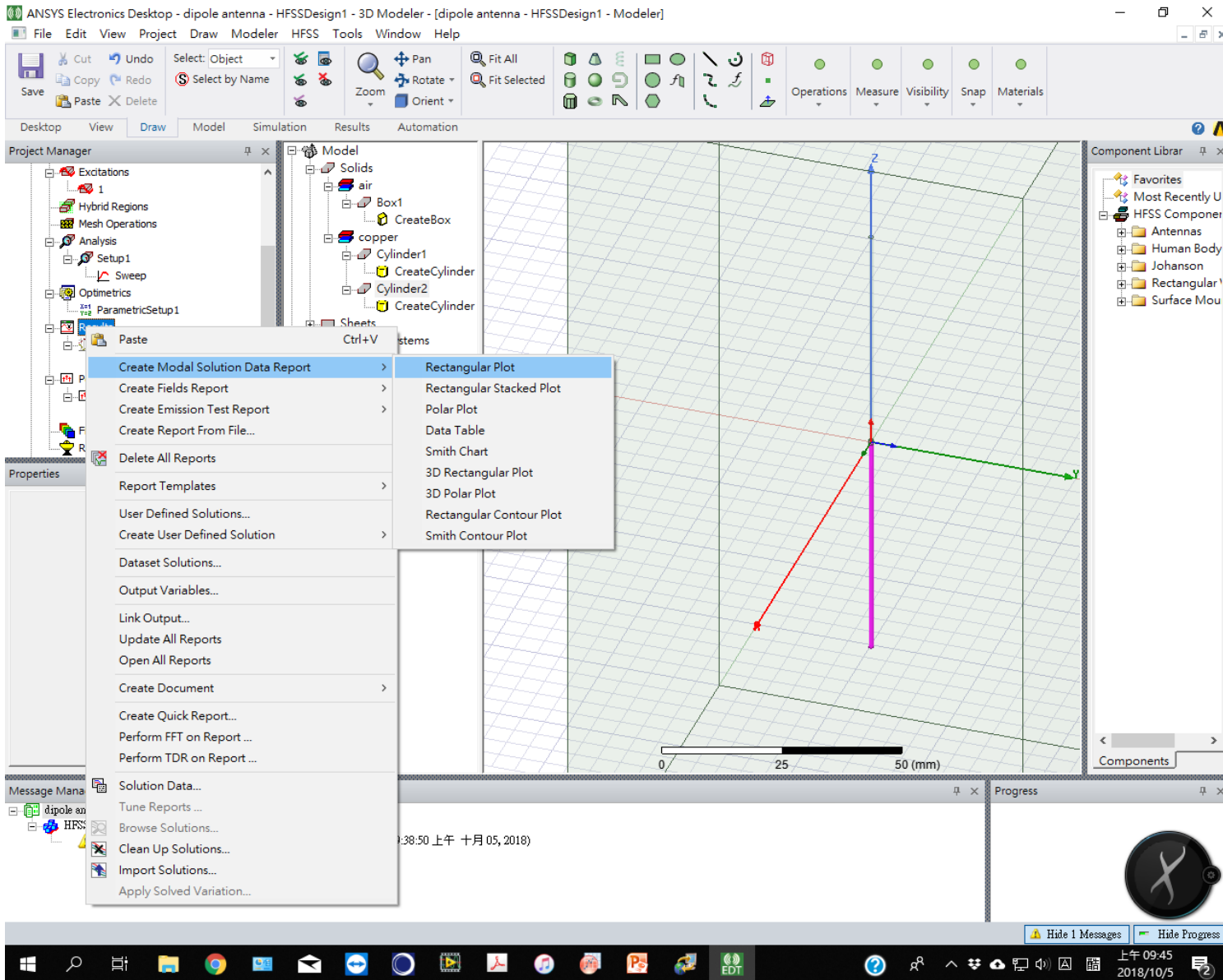
- dipole antenna (C:/Users/QDL/Documents/Ansoft/)
- HFSSDesign1 (DrivenModal)
 - HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 十月 05, 2018)

Ready

Hide 1 Messages Hide Progress

上午 09:45 2018/10/5

9.4 我們希望程式可以 畫出S 參數的相位圖。在Results中選Create Model Solution Data Report: Rectangular Plot



9.5 表中選擇S(1,1): ang_rad 代表相位用rad單位表示。建立好的Plot 2此時圖形內容為空白

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The main window shows an empty S Parameter Plot 2. A 'Report' dialog box is open, showing the configuration for the plot. The 'Context' section shows the solution is 'Setup1: Sweep' and the domain is 'Sweep'. The 'Trace' section shows the primary sweep is 'Freq' and the variable is 'ang_rad(S(1,1))'. The 'Properties' window shows the plot's name is 'ang_rad(S(1,1))' and the Y-axis is 'Y1'. The 'Message Manager' shows a warning that solutions have been invalidated.

Report: dipole antenna - HFSSDesign1 - S Parameter Plot 2 - ang_rad(S(1,1))

Context

Solution: Setup1: Sweep

Domain: Sweep

TDR Options...

Trace Families Families Display

Primary Sweep: Freq All

X: Default Freq

Y: ang_rad(S(1,1)) Range Function...

Category: Quantity: Function:

Variables		<none>
Output Variables	S(1,1)	ang_deg
S Parameter		ang_deg_val
Y Parameter		ang_rad
Z Parameter		arg
VSWR		cang_deg
Gamma		cang_deg_val
Port Zo		cang_rad
Lambda		dB
Epsilon		dB10normalize
Group Delay		dB20normalize
Active S Parameter		dBc
Active Y Parameter		jm
Active Z Parameter		mag
Active VSWR		normalize
Passivity		re
Design		

Update Report

Real time Update

Output Variables... Options... New Report Apply Trace Add Trace Close

Message Manager

dipole antenna (C:/Users/QDL/Documents/Ansoft/)

HFSSDesign1 (DrivenModal)

Warning: HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 十月 05, 2018)

9.6 在Project視窗按右鍵可以進行Validation check，並Analyze all

The screenshot displays the ANSYS Electronics Desktop software interface. The main window shows a 3D model of a dipole antenna in a coordinate system with X, Y, and Z axes. A context menu is open over the Project Manager tree, listing various actions such as Copy, Paste, Delete, and Analysis. The 'Analyze All' option is highlighted. The interface includes a top menu bar, a toolbar, and several panels: Project Manager, Properties, Component Library, and Message Manager. The Message Manager shows a warning message: 'HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 十月 05, 2018)'. The Windows taskbar at the bottom shows the system clock as 上午 09:48, 2018/10/5.

9.7 在Progress視窗可以看到不同參數計算的進度條：Solved 是已完成數，Remaining是還需要計算的數目

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The main 3D view shows a wireframe model of the antenna structure on a grid. The Project Manager on the left lists the design hierarchy, including the HFSSDesign1 (DrivenModal) and its various components like boundaries, excitations, and analysis setups. The Properties panel at the bottom left shows the material set to 'copper' and the model type as 'Model'. The Message Manager at the bottom left shows a warning that solutions have been invalidated and a message that parametric analysis has started. The Progress window at the bottom right shows the simulation status: 'HFSSDesign1 Parametric Analysis on Local Machine - RUNNING'. It displays the analysis progress: 'Solved = 0 Solving = 1 Remaining = 10'. Below this, it indicates the current task: 'dipole antenna - HFSSDesign1 - Setup1: Solving Fast Sweep 'Sweep' on Local Machine - RUNNING'. A green progress bar is visible, and the current task is 'Computing Krylov vector 17 up to 60'. The Windows taskbar at the bottom shows the system time as 09:49 on 2018/10/5.

Name	Value	Unit	Evaluated Va...
Name	Cylinde...		
Material	"copper"		"copper"
Solve Ins...	<input type="checkbox"/>		
Orientati...	Global		
Model	<input checked="" type="checkbox"/>		
Group	Model		
Display ...	<input type="checkbox"/>		
Material ...	<input type="checkbox"/>		
Color			
Transpar...	0		

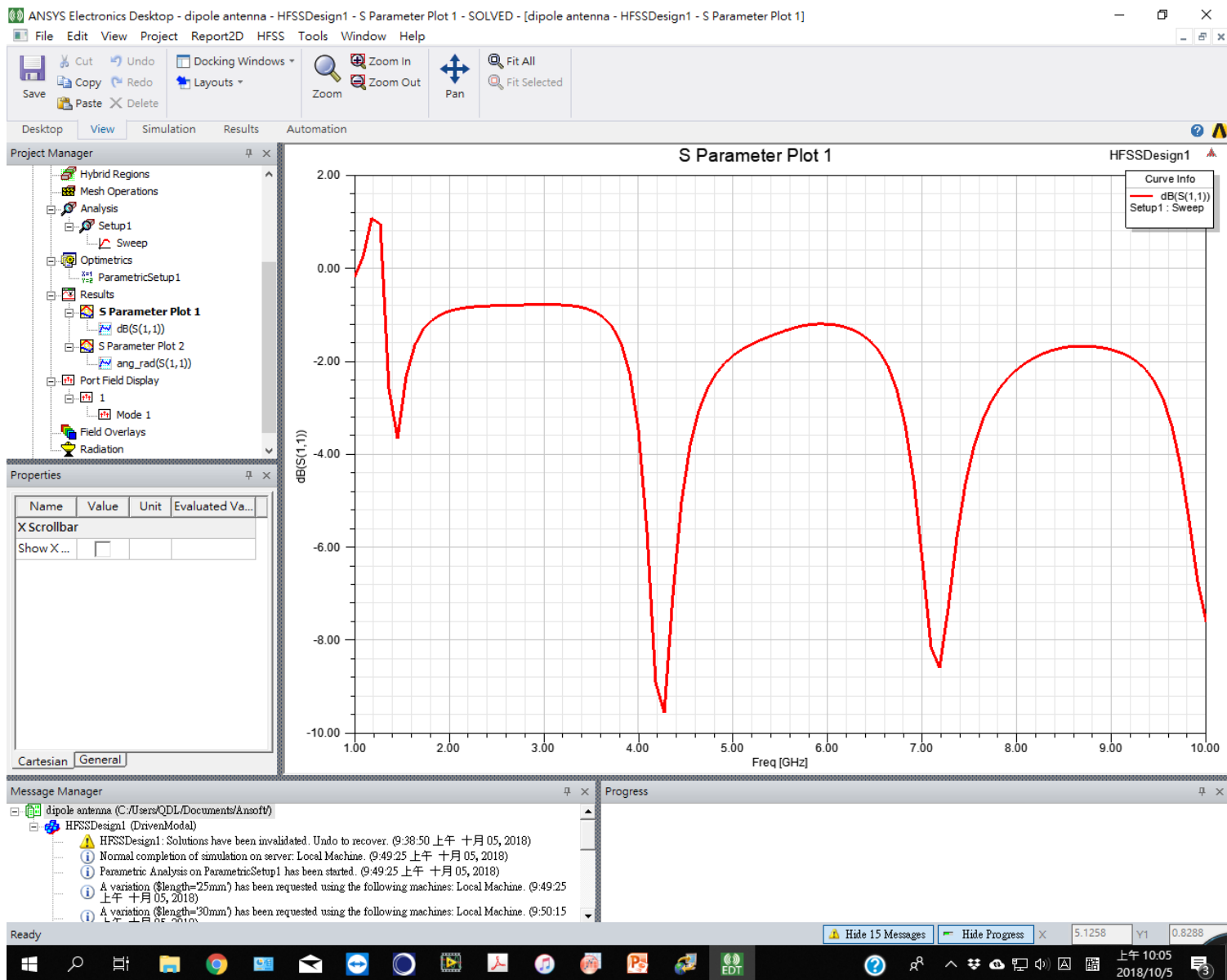
HFSSDesign1 Parametric Analysis on Local Machine - RUNNING

Analysis progress: Solved = 0 Solving = 1 Remaining = 10

dipole antenna - HFSSDesign1 - Setup1: Solving Fast Sweep 'Sweep' on Local Machine - RUNNING

Computing Krylov vector 17 up to 60.

10.1 算完後，發現Plot 1未改變。因為需要重新設定繪出的數據。



10.2 可以點選圖形右方的第二頁Families。可以看到變數名稱\$length，Value為normal。

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The main window shows an S Parameter Plot of dB(S(1,1)) versus frequency (GHz). The plot shows a resonance peak around 1.5 GHz and a broader peak around 8.5 GHz. A dialog box titled "Report: dipole antenna - HFSSDesign1 - S Parameter Plot 1 - dB(S(1,1))" is open, showing the configuration for the plot. The dialog includes a "Families" tab with a table of available families.

Variable	Value	Edit
\$length	Nominal	...

The dialog also shows the context (Setup1: Sweep), domain (Sweep), and options for the report. The Properties panel on the left shows the plot's name as dB(S(1,1)) and the Y-axis as Y1. The Message Manager at the bottom shows simulation progress and messages.

10.3 在變數名稱\$length最右欄位按Edit，選擇Use all values。此時Value變成All。

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The main window shows the S Parameter Plot 1, which plots the return loss $\text{dB}(S(1,1))$ against frequency in GHz. The plot shows a resonance peak around 1.5 GHz. A dialog box titled "Report: dipole antenna - HFSSDesign1 - S Parameter Plot 1 - $\text{dB}(S(1,1))$ " is open, showing the variable "length" with the value "All". A secondary dialog box is also open, showing the "Use all values" option selected.

The Properties panel on the left shows the following details for the S Parameter Plot 1:

Name	Value
Name	$\text{dB}(S(1,1))$
Y Axis	Y1
Primary ...	Freq
Components	
Y Comp...	$\text{dB}(S(1,1))$
X Comp...	Freq
Context	
Solution	Setup1 : Sweep
Domain	Sweep

The Message Manager at the bottom shows the following log entries:

- HFSSDesign1 : Solutions have been invalidated. Undo to recover. (9:38:50 上午 10月 05, 2018)
- Normal completion of simulation on server: Local Machine. (9:49:25 上午 10月 05, 2018)
- Parametric Analysis on ParametricSetup1 has been started. (9:49:25 上午 10月 05, 2018)
- A variation (\$length=25mm) has been requested using the following machines: Local Machine. (9:49:25 上午 10月 05, 2018)
- A variation (\$length=30mm) has been requested using the following machines: Local Machine. (9:50:15 上午 10月 05, 2018)

10.4 所有不同變數的S 參數曲線疊合在Plot 1

ANSYS Electronics Desktop - dipole antenna - HFSSDesign1 - S Parameter Plot 1 - SOLVED - [dipole antenna - HFSSDesign1 - S Parameter Plot 1]

File Edit View Project Report2D HFSS Tools Window Help

Save Cut Undo Copy Paste X Delete Docking Windows Zoom Zoom In Zoom Out Pan Fit All Fit Selected

Desktop View Simulation Results Automation

Project Manager

- Hybrid Regions
- Mesh Operations
- Analysis
 - Setup1
 - Sweep
 - Optimetrics
 - ParametricSetup1
- Results
 - S Parameter Plot 1**
 - dB(S(1,1))
 - S Parameter Plot 2
 - ang_rad(S(1,1))
 - Port Field Display
 - 1
 - Mode 1
 - Field Overlays
 - Radiation

Properties

Name	Value
Specify...	<input type="checkbox"/>
Name	dB(S(1,1))
Y Axis	Y1
Primary...	Freq
Components	
Y Comp...	dB(S(1,1))
X Comp...	Freq
Context	
Solution	Setup1 : Sweep
Domain	Sweep

S Parameter Plot 1

HFSSDesign1

Curve Info

- dB(S(1,1)) Setup1 : Sweep Length=25mm'
- dB(S(1,1)) Setup1 : Sweep Length=30mm'
- dB(S(1,1)) Setup1 : Sweep Length=35mm'
- dB(S(1,1)) Setup1 : Sweep Length=40mm'
- dB(S(1,1)) Setup1 : Sweep Length=45mm'
- dB(S(1,1)) Setup1 : Sweep Length=50mm'
- dB(S(1,1)) Setup1 : Sweep Length=55mm'
- dB(S(1,1)) Setup1 : Sweep Length=60mm'
- dB(S(1,1)) Setup1 : Sweep Length=65mm'
- dB(S(1,1)) Setup1 : Sweep Length=70mm'
- dB(S(1,1)) Setup1 : Sweep Length=75mm'

Message Manager

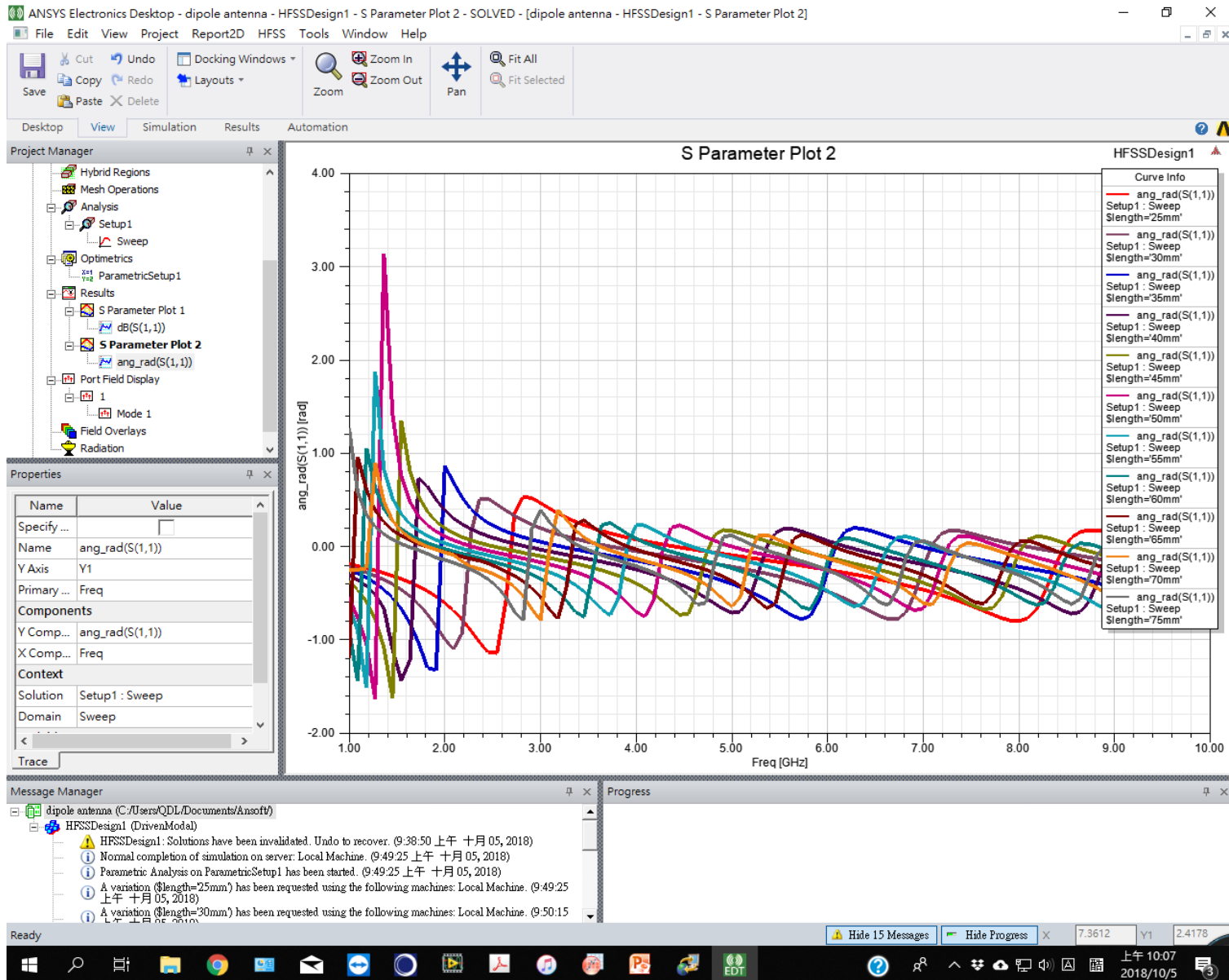
- dipole antenna (C:/Users/QDL/Documents/Ansoft/)
- HFSSDesign1 (DrivenModal)
 - HFSSDesign1: Solutions have been invalidated. Undo to recover. (9:38:50 上午 10月 05, 2018)
 - Normal completion of simulation on server: Local Machine. (9:49:25 上午 10月 05, 2018)
 - Parametric Analysis on ParametricSetup1 has been started. (9:49:25 上午 10月 05, 2018)
 - A variation (\$length=25mm') has been requested using the following machines: Local Machine. (9:49:25 上午 10月 05, 2018)
 - A variation (\$length=30mm') has been requested using the following machines: Local Machine. (9:50:15 上午 10月 05, 2018)

Ready

Hide 15 Messages Hide Progress X 7.1382 Y1 -15.8005

上午 10:07 2018/10/5

10.5 Plot 2則是自動疊合，不需要重新更改資料內容。



10.6 Plot數據可以輸出方便整理或分析，在圖上按右鍵選 Export。

The screenshot displays the ANSYS Electronics Desktop interface for a dipole antenna simulation. The main window shows an S Parameter Plot titled "S Parameter Plot 1" for HFSSDesign1. The plot displays the magnitude of the S-parameter, $dB(S(1,1))$, on the y-axis (ranging from -20.00 to 2.50) against the frequency in GHz on the x-axis (ranging from 1.00 to 6.00). Multiple curves are plotted, representing different sweep lengths: 25mm, 30mm, 35mm, 40mm, and 45mm. A context menu is open over the plot, with the "Export..." option highlighted. The menu options include: Marker, Trace Characteristics, Add Note..., Add Limit Line, View, Accumulate, Edit, Modify Report..., Update Report, Report Templates, Export..., Import..., Copy Bitmap Image, and Export Legend... The interface also shows the Project Manager on the left, the Properties panel at the bottom left, and the Message Manager at the bottom. The Windows taskbar at the very bottom shows the system tray with the date and time: 下午 12:00, 2018/10/5.

10.7 輸出格式可以選CSV文字格式，使用Excel或Origin處理。

The screenshot displays the ANSYS Electronics Desktop interface for a project named "dipole antenna - HFSSDesign1 - S Parameter Plot 1 - SOLVED". The main window shows the "S Parameter Plot 1" report being exported. The "Export Report" dialog box is open, showing the file name "S Parameter Plot 1" and the format "Comma delimited data files (*.csv)". The file is being saved to the "Ansoft" directory. The "Export Uniform Points" checkbox is unchecked, and the "Export with Full Sweep" checkbox is checked. The frequency is set to 1 GHz. The file format dropdown menu is open, showing various options, with "Comma delimited data files (*.csv)" selected.

Project Manager:

- dipole antenna
 - HFSSDesign1 (DrivenModal)
 - 3D Components
 - Model
 - Boundaries
 - Excitations
 - Hybrid Regions
 - Mesh Operations
 - Analysis
 - Optimetrics
 - Results
 - S Parameter Plot 1
 - S Parameter Plot 2
 - Port Field Display
 - Field Overlays
 - Radiation

Properties:

Name	Value	Unit	Evaluated Va...
X Scrollbar			
Show X ...	<input type="checkbox"/>		

Message Manager: Progress

System Tray: Ready, Hide 0 Messages, Hide Progress, 5.9043, Y1, -14.4420, 下午 12:00, 2018/10/5