

newFASANT

CHAFF: Dynamic Clouds

Benchmark: Dynamic Size and Position

Software Version: 6.2.7

Date: May 2016

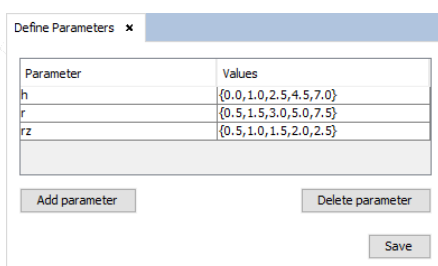
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1. Benchmark description and objectives

This benchmark presents an example of a chaff with a dynamic cloud. The cloud has an ellipsoidal shape that starts with the same radius values for all axes (initially has a spherical shape) and in each step the values of the radii are changed. For the radius changes we use a set of parameters that vary linearly. 'X' and 'Y' axes have the same values for each step and 'Z' value increases slower. The cloud is also in movement, that is obtained using another parameter for the center of the cloud. Only the 'Z' coordinate of the center will be dynamic then the movement will be upward.

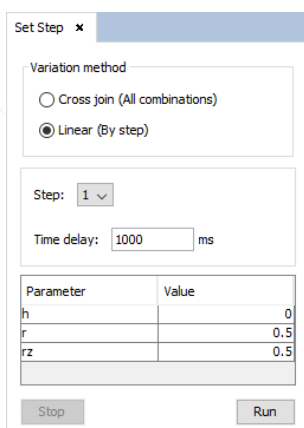
Previous to generate de chaff cloud is necessary to define the dynamic parameters and its values for the steps:



Parameter	Values
h	{0.0, 1.0, 2.5, 4.5, 7.0}
r	{0.5, 1.5, 3.0, 5.0, 7.5}
rz	{0.5, 1.0, 1.5, 2.0, 2.5}

Buttons: Add parameter, Delete parameter, Save

'h' parameter will be used for the 'Z' coordinate of the cloud center, 'r' parameter will be used for the radius of the 'X' and 'Y' axes and 'rz' parameter will be used for the radius of the 'Z' axis.



Variation method:
 Cross join (All combinations)
 Linear (By step)

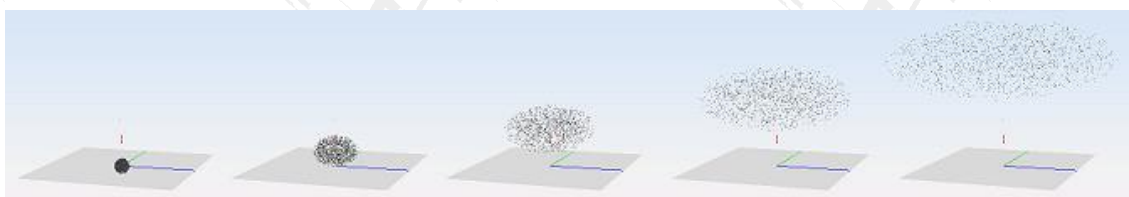
Step: 1

Time delay: 1000 ms

Parameter	Value
h	0
r	0.5
rz	0.5

Buttons: Stop, Run

Select the option for linear combination of these parameters in order to have one simulation with the value of the iteration position for each value, i.e., first iteration will use 0.0 for 'h' parameter, 0.5 for 'r' parameter and 0.5 for 'rz' parameter as the left figure shows. By selecting other value on the 'Step' combo box you can see the value for the parameters in the selected step.



The values for the radius and positions are around of meters and the simulation frequency is 3 GHz.

For more information about the parameters, see the [newFASANT Chaff Module User Guide](#).

2. Set-up description

2.1. Simulation Parameters

Simulation ×

Frequency

Enable Sweep Initial frequency:

Units: GHz Final frequency:

 Samples:

Ground plane

Enable ground plane Parameters

Save

RCS ×

RCS Type

Monostatic RCS Bistatic RCS

Plane Wave Parameters

Polarization Wave

Etheta: ,

Ephi: ,

Incidence Angle

Theta: °

Phi: °

Tx-Rx Angle

Angle: °

Save

Observation Directions ×

Theta cuts

Theta cut	Initial phi	Increment	Samples	Final phi

Delete Add

Phi cuts

Phi cut	Initial theta	Increment	Samples	Final theta
0.0	0.0	1.0	181	180.0

Delete Add

Save

2.2. Solver Parameters

Solver ×

Solver Method

Domain Decomposition
 Method of Moments (MoM)

Conductor losses: Ohm/m

Other Parameters

Relative error:

Maximum number iterations:

Save

2.3. Meshing Parameters

Meshing
✕

Divisions per wavelength

Planar surfaces:

Curved surfaces:

Frequency

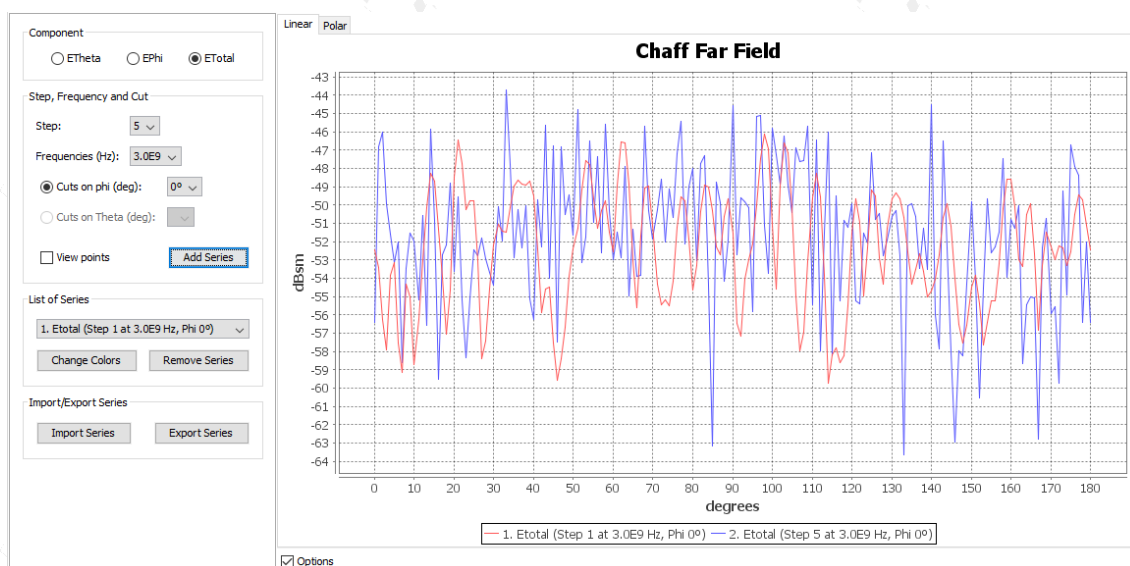
Frequency: GHz

Processors

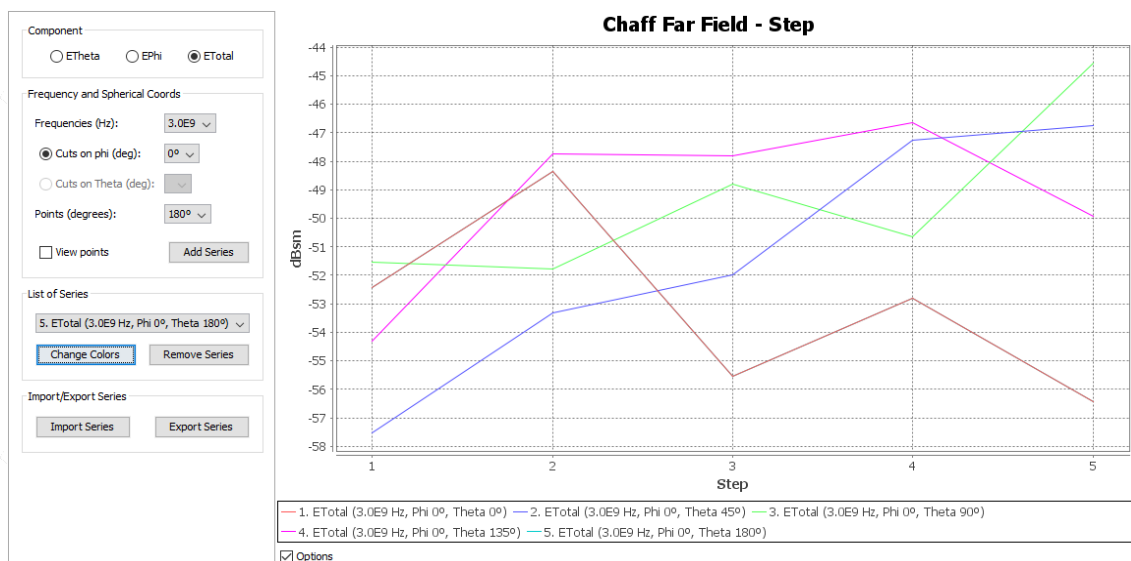
Processors:

3. Results

The following image presents the RCS values for the far field observations selected on the simulation parameters. Plot the RCS values in dBsm over the degrees of the observation sweep for each step.



The following image presents the RCS values of selected observation point on the sweep over the steps.



4. CPU resources

CPU type		Workstation / Personal Computer / Laptop: Memory + Processors	
Resources	Number of processors	RAM required (GB)	Time Required (mm : ss)
Configuration1	4	1.9	05:14

5. Geometry and newFASANT project files

The included files for this benchmark are only the NewFASANT project file (.nfp) called 'dynamicSizeAndPosition.nfp'.