

newFASANT

Post-Process User Guide

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Index

| | |
|----------------------------------|-----------|
| 1. POST-PROCESS MENU | 3 |
| 2. POST-PROCESS WINDOW | 3 |
| 3. TRACE WINDOW | 5 |
| 3.1. TRACE OPTIONS PANEL | 6 |
| 3.2. TRACE REPRESENTATION PANEL | 7 |
| 4. TRACE RESULTS OUTPUT | 8 |
| 5. EXAMPLES | 10 |
| 5.1. EXAMPLE 1: TABLE TRACE | 10 |
| 5.2. EXAMPLE 2: PLOT TRACE | 12 |
| 5.3. EXAMPLE 3: DIAGRAM 2D TRACE | 14 |
| 5.4. EXAMPLE 4: DIAGRAM 3D TRACE | 16 |
| 5.5. EXAMPLE 5: TEXT FILE TRACE | 17 |

1. Post-Process Menu

Post-Process is an option from the “Show Results” menu, available for some modules.

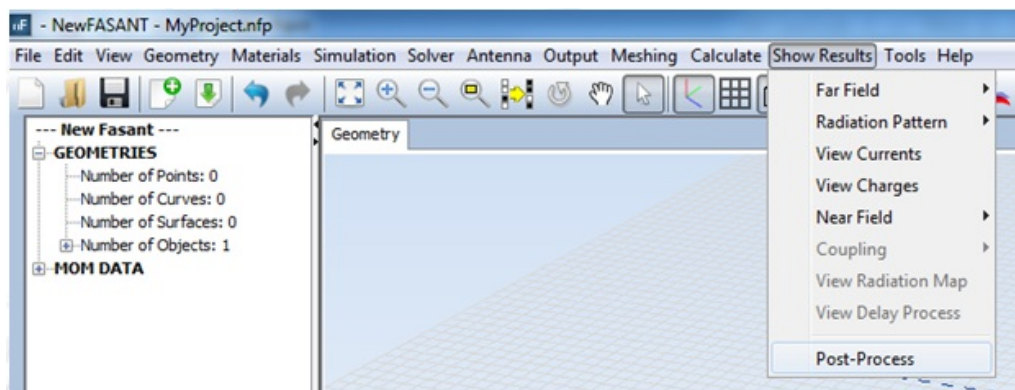


Figure 1: Show Results menu

The steps to be followed in order to post-process a result are the same in all the cases:

1. Select the type of the representation for the results in the first window that appears (post-process window).
2. Select, on the second window (trace window), the type of the results for the post-processing, set the required options and select the domain of the representation (only for table and plot representations).

In the next chapters more details are given regarding the functionalities of the two windows that post-process uses to get a customized result.

2. Post-Process Window

This window allows the user to select the type of representation to visualize the new trace.

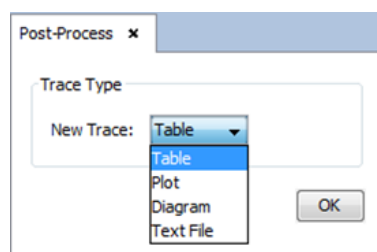


Figure 2: Post-Process Window

New Trace options:

- Table: visualize the results as a table of values indicating, for each value of the domain, the value of the result to be associated.

Geometry Post-Process x

Far Field in Phi 0.0° at 1.0 GHz, Step 1

| Theta (degrees) | ETheta-real | ETheta-imaginary |
|-----------------|-------------|------------------|
| 0.0 | -5.621E-7 | 4.442E-7 |
| 10.0 | 4.313E-4 | -0.001188 |
| 20.0 | 0.00278 | -8.012E-4 |
| 30.0 | 0.001606 | -0.002447 |
| 40.0 | -0.00337 | 0.002095 |
| 50.0 | 0.004456 | 0.001161 |
| 60.0 | -0.005511 | -0.002246 |
| 70.0 | 0.005438 | 0.001013 |
| 80.0 | -0.006251 | 9.908E-4 |
| 90.0 | 0.00492 | -0.003908 |
| 100.0 | -0.002275 | 0.005781 |
| 110.0 | 4.537E-4 | -0.005692 |
| 120.0 | 0.00125 | 0.00563 |
| 130.0 | 2.527E-4 | -0.004901 |
| 140.0 | -0.002602 | 0.002648 |
| 150.0 | 0.00212 | -5.126E-4 |
| 160.0 | -5.116E-4 | -0.001 |
| 170.0 | -7.798E-4 | 0.001465 |
| 180.0 | 5.632E-7 | -4.423E-7 |

Export as plot

Figure 3: Table trace

- Plot: visualize the results as a plot of values drawing a line that represent the result values for each value of the domain of representation.

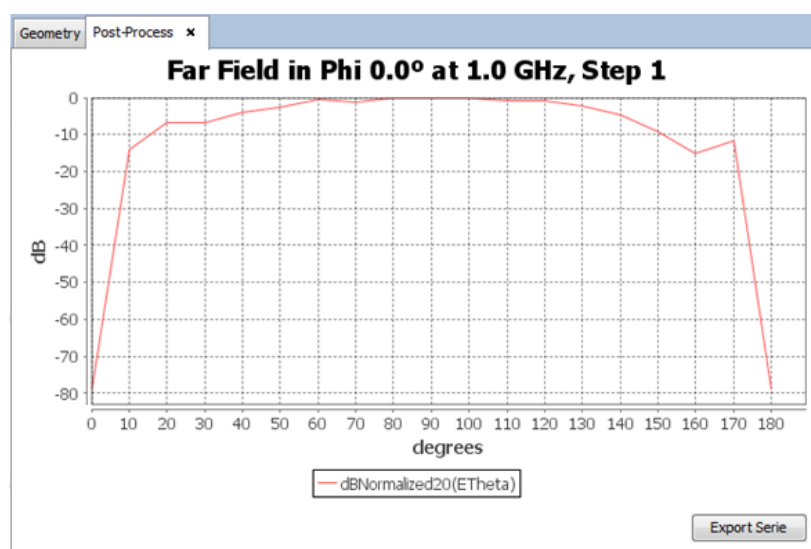


Figure 4: Plot trace

Most of plots show 2-D curves of a result field versus an input parameter. This type of graphics share additional features of zoom, raxis and curves edition, and so on. To read more information about the chart options (when clicking on the righth button over a chart) see [section 7. Annex I "Graphics advanced options"](#) on [GUI User-Guide](#).

- Diagram: visualize the results as a 2D or 3D diagram that represent the resulting values as a color (2D) or color and radius (3D) over the scale of values.

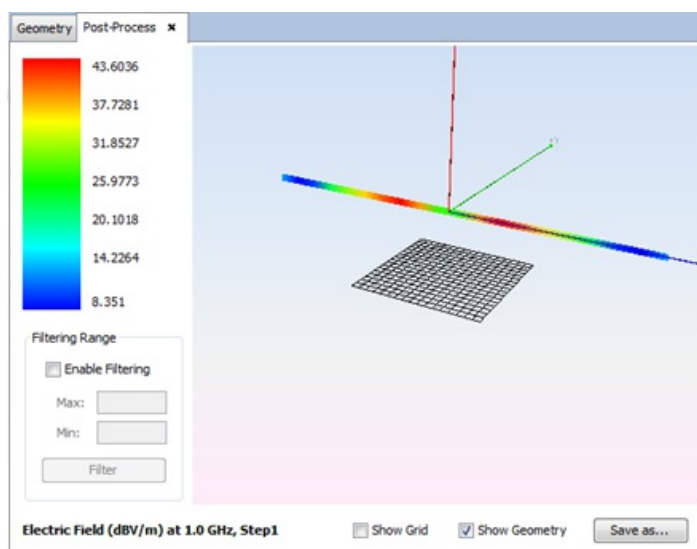
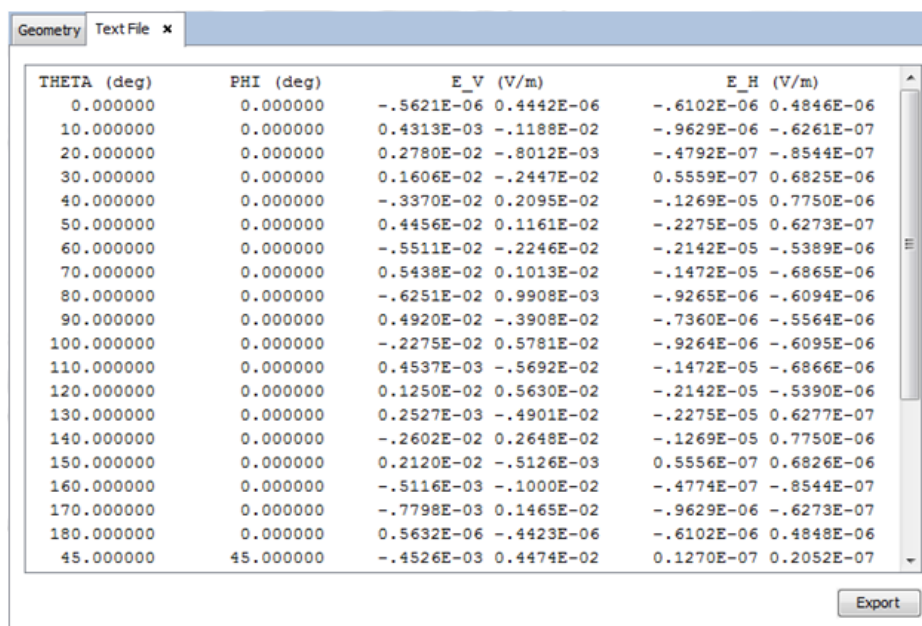


Figure 5: Diagram Trace

- Text File: visualize the results on plain text and show the results file.



| THETA (deg) | PHI (deg) | E_V (V/m) | | E_H (V/m) | |
|-------------|-----------|------------|------------|------------|------------|
| 0.000000 | 0.000000 | -.5621E-06 | 0.4442E-06 | -.6102E-06 | 0.4846E-06 |
| 10.000000 | 0.000000 | 0.4313E-03 | -.1188E-02 | -.9629E-06 | -.6261E-07 |
| 20.000000 | 0.000000 | 0.2780E-02 | -.8012E-03 | -.4792E-07 | -.8544E-07 |
| 30.000000 | 0.000000 | 0.1606E-02 | -.2447E-02 | 0.5559E-07 | 0.6825E-06 |
| 40.000000 | 0.000000 | -.3370E-02 | 0.2095E-02 | -.1269E-05 | 0.7750E-06 |
| 50.000000 | 0.000000 | 0.4456E-02 | 0.1161E-02 | -.2275E-05 | 0.6273E-07 |
| 60.000000 | 0.000000 | -.5511E-02 | -.2246E-02 | -.2142E-05 | -.5389E-06 |
| 70.000000 | 0.000000 | 0.5438E-02 | 0.1013E-02 | -.1472E-05 | -.6865E-06 |
| 80.000000 | 0.000000 | -.6251E-02 | 0.9908E-03 | -.9265E-06 | -.6094E-06 |
| 90.000000 | 0.000000 | 0.4920E-02 | -.3908E-02 | -.7360E-06 | -.5564E-06 |
| 100.000000 | 0.000000 | -.2275E-02 | 0.5781E-02 | -.9264E-06 | -.6095E-06 |
| 110.000000 | 0.000000 | 0.4537E-03 | -.5692E-02 | -.1472E-05 | -.6866E-06 |
| 120.000000 | 0.000000 | 0.1250E-02 | 0.5630E-02 | -.2142E-05 | -.5390E-06 |
| 130.000000 | 0.000000 | 0.2527E-03 | -.4901E-02 | -.2275E-05 | 0.6277E-07 |
| 140.000000 | 0.000000 | -.2602E-02 | 0.2648E-02 | -.1269E-05 | 0.7750E-06 |
| 150.000000 | 0.000000 | 0.2120E-02 | -.5126E-03 | 0.5556E-07 | 0.6826E-06 |
| 160.000000 | 0.000000 | -.5116E-03 | -.1000E-02 | -.4774E-07 | -.8544E-07 |
| 170.000000 | 0.000000 | -.7798E-03 | 0.1465E-02 | -.9629E-06 | -.6273E-07 |
| 180.000000 | 0.000000 | 0.5632E-06 | -.4423E-06 | -.6102E-06 | 0.4848E-06 |
| 45.000000 | 45.000000 | -.4526E-03 | 0.4474E-02 | 0.1270E-07 | 0.2052E-07 |

Figure 6: Diagram Trace

3. Trace Window

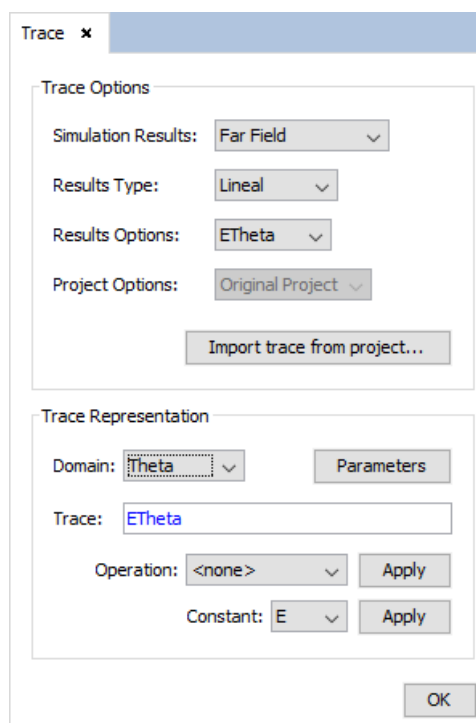


Figure 7: Trace Window

3.1. Trace Options Panel

This panel allows the user to configure the results that will be shown in the new trace.

- Simulation Results: in this list, the user selects the type of the result to visualize. This list only includes the results according to the type of representation selected from the post-process window. For example, if the user selects the "table" option in the post-process window, the "Current Density" option for the simulation result will not appear because "Current Density" results only can only be visualized in diagram trace.
- Results Type: in this list, the user selects a sub-type from the results selected on the previous list. This list only includes the sub-types of the results selected on the previous list, modifying it when the user changes the selected value on the "Simulation Results" list.
- Results Options: this list is an auxiliary list that will be filled only if the results have other options (additional to the "Result Type" options). This list will be used, for example, for the "Near Field" results that have "Ex", "Ey", "Ez", "ETotal", "Hx", "Hy", "Hz" and "HTotal" as "Results Type" and "Scatter", "Direct" and "Total" as "Result Options".
- Project Options: allows the user to select which project will take the results to load at that time to bring them into line results. The projects will be displayed in the list with the name of the project in question, accompanied by the nickname that will put the loaded result, for example, if the selected project is "Project002.nfp (_1)" and the result selected in "ETheta" when loaded in the result line will appear as "ETheta_2".
- "Import trace from project" button: Allows the user to import the result that corresponds with a previous project having these same results. This button shows a window where the user needs to select the ".nfp" file(s) to import the results. Then, in the "Result Type" list, a new option appears including the name of the selected option with an added numeric value corresponding to each imported file.

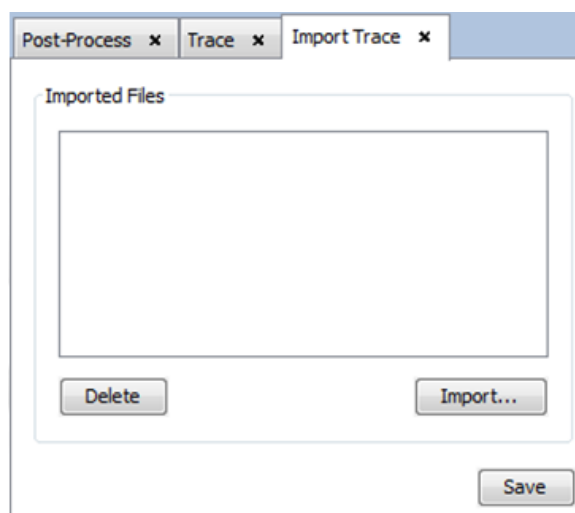


Figure 8: Import trace Window

- "Delete": remove the selected row for the file previously imported and close it from imported projects.
- "Import": import the results from a selected file and open the project to use its results.
- "Save": load the changes into "Trace Window" to actualize the enable imported projects.

3.2. Trace representation Panel

This panel allows the user to configure the representation of the results and the application of formulas over the original results to customize the results to be visualized.

- Domain: this list allows the user to select a parameter to visualize the results (applying a function to such parameter). For each value of this parameter one result value will be visualized.
- "Parameters": this button shows a window that allows the user to configure the options for the domain of the representation. This window is specific for the result type selected and includes parameters such as "step", "frequency", "cut" (for far field), "point", "observation" (for near field) and "Angular Average" for results with domain in degrees and trace type as table, plot or diagram.
- Trace: this option shows the value that, as a function of the original results, will be represented as a result. This option allows the user to customize the representation results with the operation option and the selected original results.
- Operation: this list allows the user to select an operation to be applied to the trace results. The list contains all the operations supported. The operations are:
 - <none>: apply the result type directly.
 - abs: returns the absolute value of the value.
 - acos: returns the arc cosine value in degrees.
 - acosr: returns the arc cosine value in radians.
 - ampl10: returns the amplitude in dB of a squared magnitude value.
 - ampl20: returns the amplitude in dB of a lineal magnitude value.
 - asin: returns the arc sine value in degrees.
 - asinr: returns the arc sine value in radians.
 - atan: returns the arc tangent value in degrees.
 - atanr: returns the arc tangent value in radians.
 - ceil: rounds value to the higher integer.
 - complex: returns a new complex number with the first parameter as real part and second parameter as imaginary part.

- cos: returns the cosine value of the value introduced in degrees.
- cosr: returns the cosine value of the value introduced in radians.
- dB10: returns the amplitude in dB of a squared magnitude value.
- dBNormalized10: returns the normalized amplitude in dB of a squared magnitude value.
- dB20: returns the amplitude in dB of a lineal magnitude value.
- dBNormalized20: returns the normalized amplitude in dB of a lineal magnitude value.
- deg: returns the value in degrees from a value in radians.
- exp: returns the power of 'e' raised to the specified the value.
- floor: truncates to the lower integer value.
- imag: returns the imaginary part of a complex value
- ln: returns the natural logarithm of the value
- log: returns the logarithm in base of the first parameter form the second parameter.
- log10: returns the logarithm in base 10 of the value.
- max: returns the maximum value of the parameters.
- min: returns the minimum value of the parameters.
- mod: returns the module of a complex value.
- nat10: returns the natural value of a squared magnitude. Returns a complex value if the input is complex and the module of the natural complex if the input is real.
- nat20: returns the natural value of a lineal magnitude. Returns a complex value if the input is complex and the module of the natural complex if the input is real.
- phase: returns the phase value from a complex value in natural units.
- pow: returns the power of the first argument raised to second argument.
- rad: returns the value in radians from a value in degrees.
- random: returns a value between 0.0 and 1.0.
- rcs: returns the Radar Cross Section value from the value.
- real: returns the real part of a complex value.
- round: returns the nearest integer value of the input value.
- sin: returns the sine of the value introduced in degrees.
- sinr: returns the sine of the value introduced in radians.
- sqrt: returns the square root of the value.
- tan: returns the tangent of the value introduced in degrees.
- tanr: returns the tangent of the value introduced in radians.

- Operation "Apply" button: this button allows the user to apply the selected operation to the represented trace. There are two possibilities to apply the operations:

- If the user selects some text in the trace text before clicking on this button, the operation will be applied over the selected text.
- If the user doesn't select some text, the operation will be applied over the Result Type option and will be written at the cursor position of the trace text.

- Constant: this list allows the user to select a constant to be added to the trace formula. The list contains all the constants defined. The constants are:

- E: adds the value of 'e' number.
- PI: adds the value of 'PI'.
- J: adds the value of the (0,1) complex number.
- SubJ: adds the value of the (0,-1) complex number.

- Constant "Apply" button: this button allows the user to apply the selected constant to the trace formula. The constant will be applied at the cursor position of the trace text.

4. Trace Results Output

This section explains the output results returned by the selected options on "Simulation Results", "Results Type" and "Results Options" combo boxes of "Trace" window.

Far Field and Radiation Pattern Results

| Simulation Results | Results Type | Results Options | Output |
|-----------------------------|--------------|-----------------|----------------------------------|
| FarField / RadiationPattern | Lineal | Etheta | Complex natural of Etheta Field. |
| FarField / RadiationPattern | Lineal | Ephi | Complex natural of Ephi Field. |
| FarField / RadiationPattern | Lineal | ETotal | Complex natural of ETotal Field. |

| | | | |
|-----------------------------|-------------|----------------|--|
| FarField / RadiationPattern | Lineal | Ex | Complex natural of Ex Field. |
| FarField / RadiationPattern | Lineal | Ey | Complex natural of Ey Field. |
| FarField / RadiationPattern | Lineal | ExEyTotal | Complex natural of ExEyTotal Field. |
| FarField / RadiationPattern | Circular | RHCP | Complex natural of RHCP Field. |
| FarField / RadiationPattern | Circular | LHCP | Complex natural of LHCP Field. |
| FarField / RadiationPattern | Circular | CircularTotal | Complex natural of CircularTotal Field. |
| FarField / RadiationPattern | Circular | AxialRatio | Axial Ratio value in dB. |
| FarField / RadiationPattern | +/-45 | +45 | Complex natural of +45 Field. |
| FarField / RadiationPattern | +/-45 | -45 | Complex natural of -45 Field. |
| FarField / RadiationPattern | 3er Ludwing | 3X_Co-Polar | Complex natural of 3X_Co-Polar Field. |
| FarField / RadiationPattern | 3er Ludwing | 3X_Cross-Polar | Complex natural of 3X_Cross-Polar Field. |
| FarField / RadiationPattern | 3er Ludwing | 3Y_Co-Polar | Complex natural of 3Y_Co-Polar Field. |
| FarField / RadiationPattern | 3er Ludwing | 3Y_Cross-Polar | Complex natural of 3Y_Cross-Polar Field. |
| FarField / RadiationPattern | Gain | ETheta | Complex natural of ETheta Power. |
| FarField / RadiationPattern | Gain | EPhi | Complex natural of EPhi Power. |
| FarField / RadiationPattern | Gain | ETotal | Total Power value in dBi. |

Far Field Results (PO Module)

| Simulation Results | Results Type | Results Options | Output |
|--------------------|--------------|-----------------|--|
| FarField | VV | <<Effects>> | Complex natural of VV Field for selected effect. |
| FarField | HV | <<Effects>> | Complex natural of HV Field for selected effect. |
| FarField | VH | <<Effects>> | Complex natural of VH Field for selected effect. |
| FarField | HH | <<Effects>> | Complex natural of HH Field for selected effect. |
| FarField | VTot | <<Effects>> | Complex natural of VTot Field for selected effect. |
| FarField | HTot | <<Effects>> | Complex natural of HTot Field for selected effect. |

<<Effects>> Can be "Total", "Simple Reflection", "Double Reflection", "Triple Reflection" or "Diffraction"

Near Field Results

| Simulation Results | Results Type | Results Options | Output |
|--------------------|--------------|-----------------|---|
| NearField | Ex | <<Type>> | Complex natural of Ex Field of selected type. |
| NearField | Ey | <<Type>> | Complex natural of Ey Field of selected type. |
| NearField | Ez | <<Type>> | Complex natural of Ez Field of selected type. |
| NearField | ETot | <<Type>> | Complex natural of ETot Field of selected type. |
| NearField | Hx | <<Type>> | Complex natural of Hx Field of selected type. |
| NearField | Hy | <<Type>> | Complex natural of Hy Field of selected type. |
| NearField | Hz | <<Type>> | Complex natural of Hz Field of selected type. |
| NearField | HTot | <<Type>> | Complex natural of HTot Field of selected type. |

<<Type>> Can be "Scatter", "Direct" or "Total"

Current Density Results

| Simulation Results | Results Type | Results Options | Output |
|--------------------|--------------|-----------------|---------------------------------------|
| Current Density | X | - | Natural value of X current value. |
| Current Density | Y | - | Natural value of Y current value. |
| Current Density | Z | - | Natural value of Z current value. |
| Current Density | Total | - | Natural value of Total current value. |

Charge Density Results

| Simulation Results | Results Type | Results Options | Output |
|--------------------|--------------|-----------------|--------------------------------|
| Charge Density | Density | - | Natural value of charge value. |

RCS (MONCROS Module)

| Simulation Results | Results Type | Results Options | Output |
|--------------------|--------------|-----------------|----------------------------------|
| RCS | ETheta | - | Complex natural of ETheta Field. |
| RCS | EPhi | - | Complex natural of EPhi Field. |
| RCS | ETotal | - | Complex natural of ETotal Field. |

5. Examples

In this section some basic examples of the use of the post-process functionality are shown. For the examples a case of the MOM Module is considered. Obtain the radiation of four planes of 250mm per side centered at points (0,0,0), (0,0,0.25), (0,0,5.25) and (0,0,5.5), on mm units, at 5.0 GHz, using a plane wave source with default parameters and the default solver parameters. The are two 'Observation Points' defined: two planes of 100x100 mm centered at (0 0 -0.5) and (0,0,6), on mm units and with 11x11 points.

To see more information about the chart options (when clicking on the righth button over a chart) see [section 7. Annex I "Graphics advanced options"](#) on [GUI User-Guide](#).

5.1. Example 1: Table trace

Step 1: Select "Table" option on "Post-Process" window.

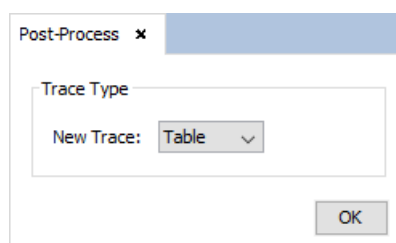


Figure 9: Step 1

Step 2: Select the simulation results and the type and sub-type from it.

Step 3: Select the domain and apply the desired operations over the original results.

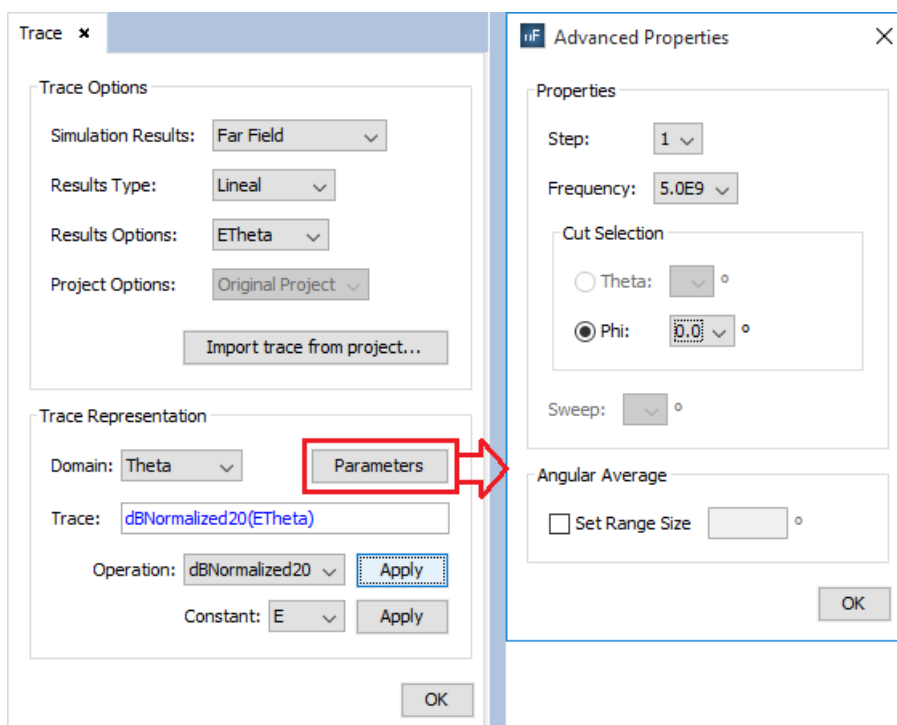


Figure 10: Step 2 and Step 3

Step 4: Click on “OK” and visualize the result.

Geometry Post-Process x

Far Field in Phi 0.0° at 5.0 GHz, Step 1

| Theta (degrees) | dBNormalized20(ETheta) (dB) |
|-----------------|-----------------------------|
| 0.0 | -0.43918202749467383 |
| 1.0 | -0.7361653030326778 |
| 2.0 | -1.6619039266647562 |
| 3.0 | -3.2871166969087966 |
| 4.0 | -5.821202899096541 |
| 5.0 | -9.733227311820855 |
| 6.0 | -16.549892355480324 |
| 7.0 | -49.79371492559069 |
| 8.0 | -18.758624540240504 |
| 9.0 | -14.784469106271288 |
| 10.0 | -13.8307062633845 |
| 11.0 | -14.671704676591787 |
| 12.0 | -17.300118022477378 |
| 13.0 | -22.872041977389173 |
| 14.0 | -46.847992132607345 |
| 15.0 | -25.267091946215942 |
| 16.0 | -20.368827911703093 |
| 17.0 | -18.766732249225697 |
| 18.0 | -18.987379160525307 |
| 19.0 | -20.86922924320838 |
| 20.0 | -25.0764627557312 |
| 21.0 | -36.250236298393034 |
| 22.0 | -32.593365687842706 |

Export as plot

Figure 11: Step 4

5.2. Example 2: Plot trace

Step 1: Select "Plot" from the "Post-Process" window.

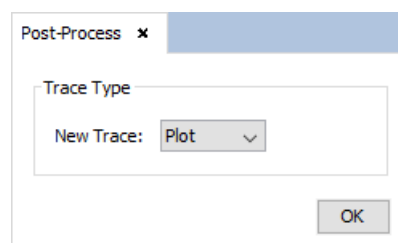


Figure 15: Step 1

Step 2: Select the simulation results and the type and sub-type from it.

Step 3: Select the domain and apply the desired operations over the original results.

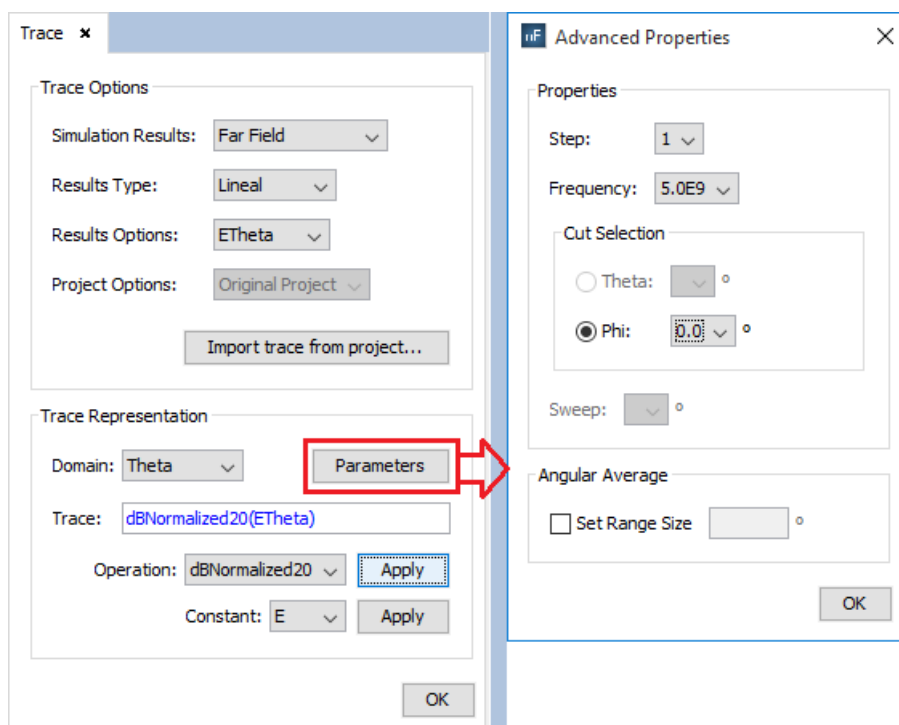


Figure 16: Step 2 and Step 3

Step 4: Click on “OK” button and visualize the result.

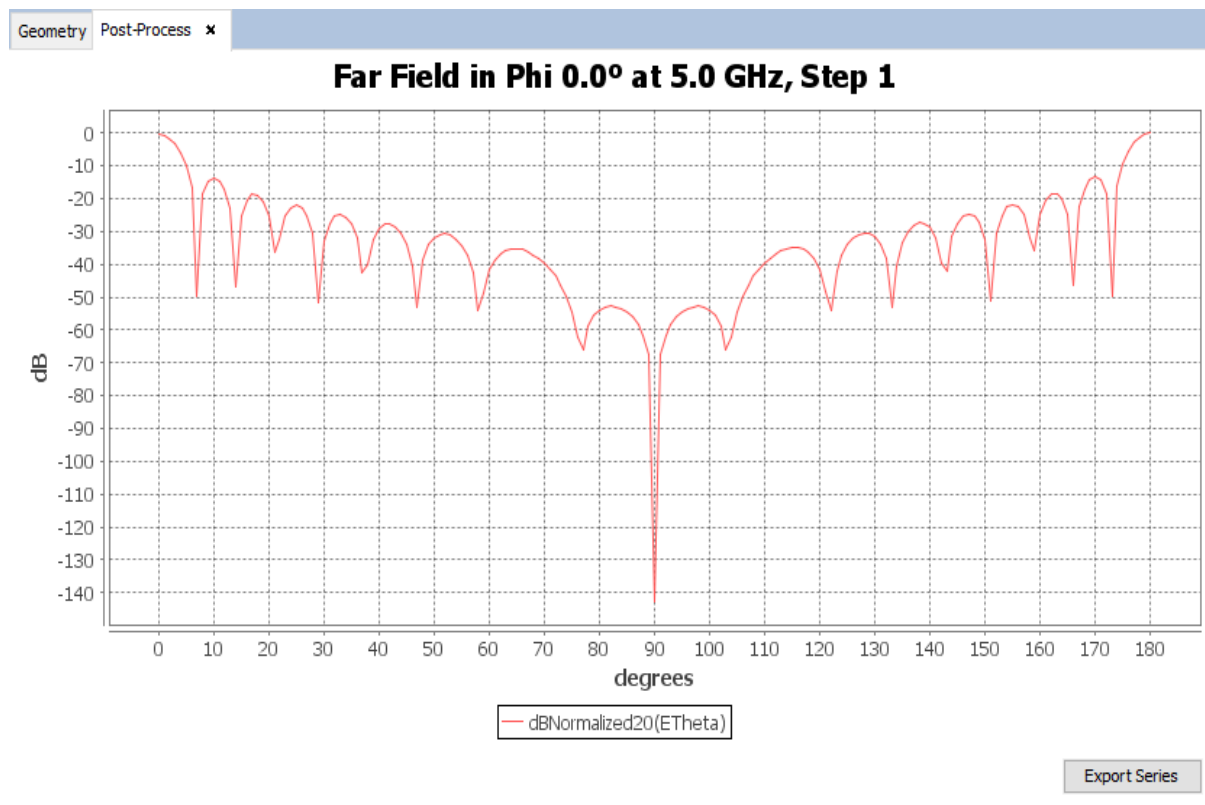


Figure 17: Step 4

5.3. Example 3: Diagram 2D trace

Step 1: Select the “Diagram” option on the “Post-Process” window.

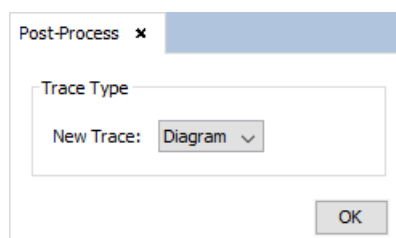


Figure 18: Step 1

Step 2: Select the simulation results and the type and sub-type from it.

Step 3: Select the domain and apply the desired operations over the original results.

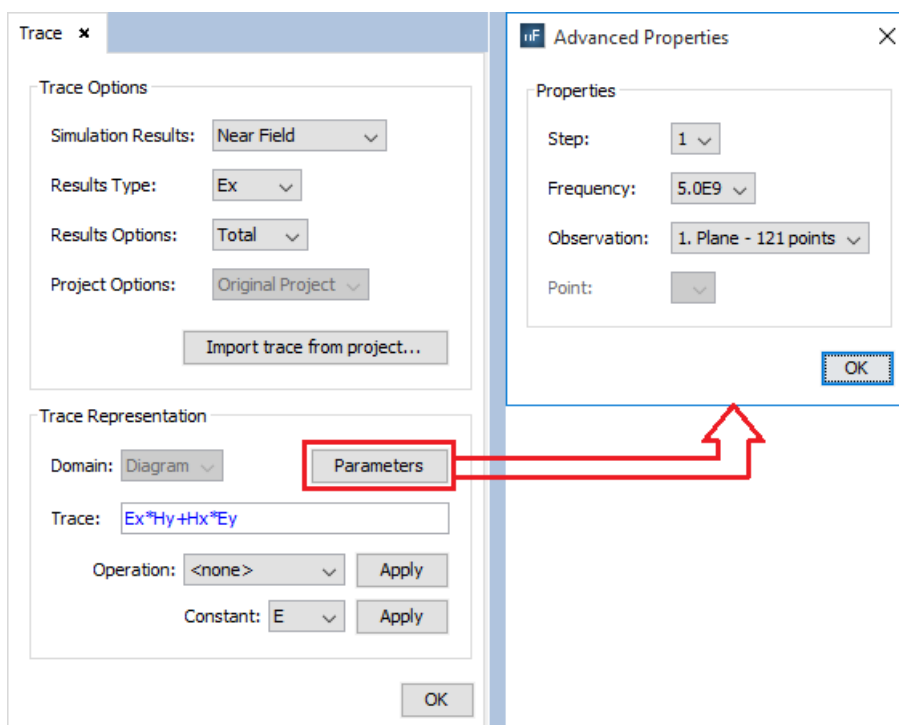


Figure 19: Step 2 and Step 3

Step 4: Click on "OK" button and visualize the result.

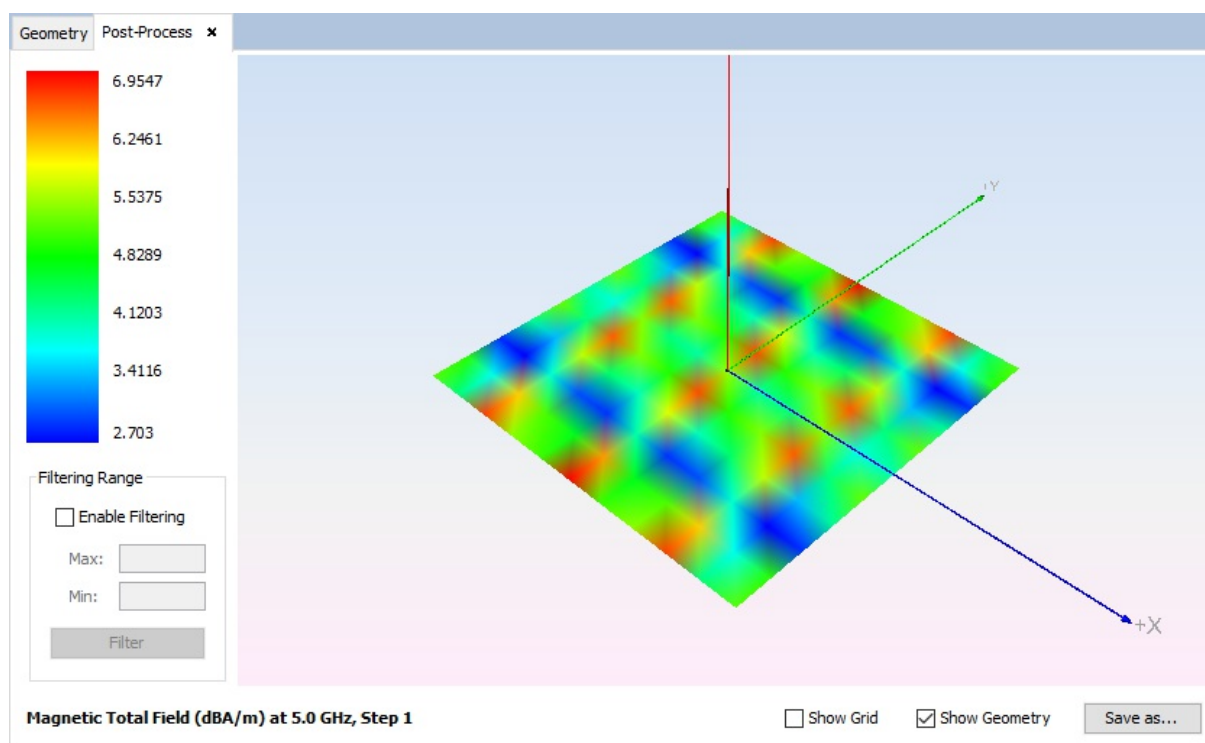


Figure 20: Step 4

5.4. Example 4: Diagram 3D trace

Step 1: Select the “Diagram” option on “Post-Process” window.

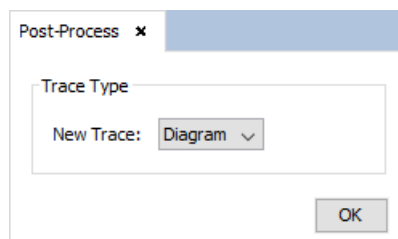


Figure 18: Step 1

Step 2: Select the simulation results and the type and sub-type from it.

Step 3: Select the domain and apply the desired operations over the original results.

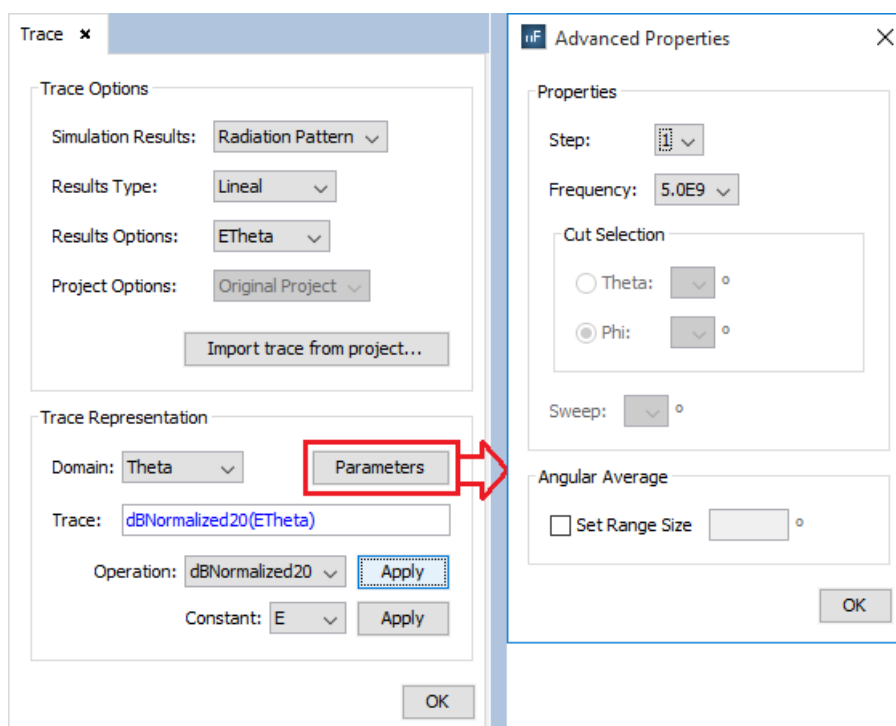


Figure 19: Step 2 and Step 3

Step 4: Click on “OK” and visualize the result.

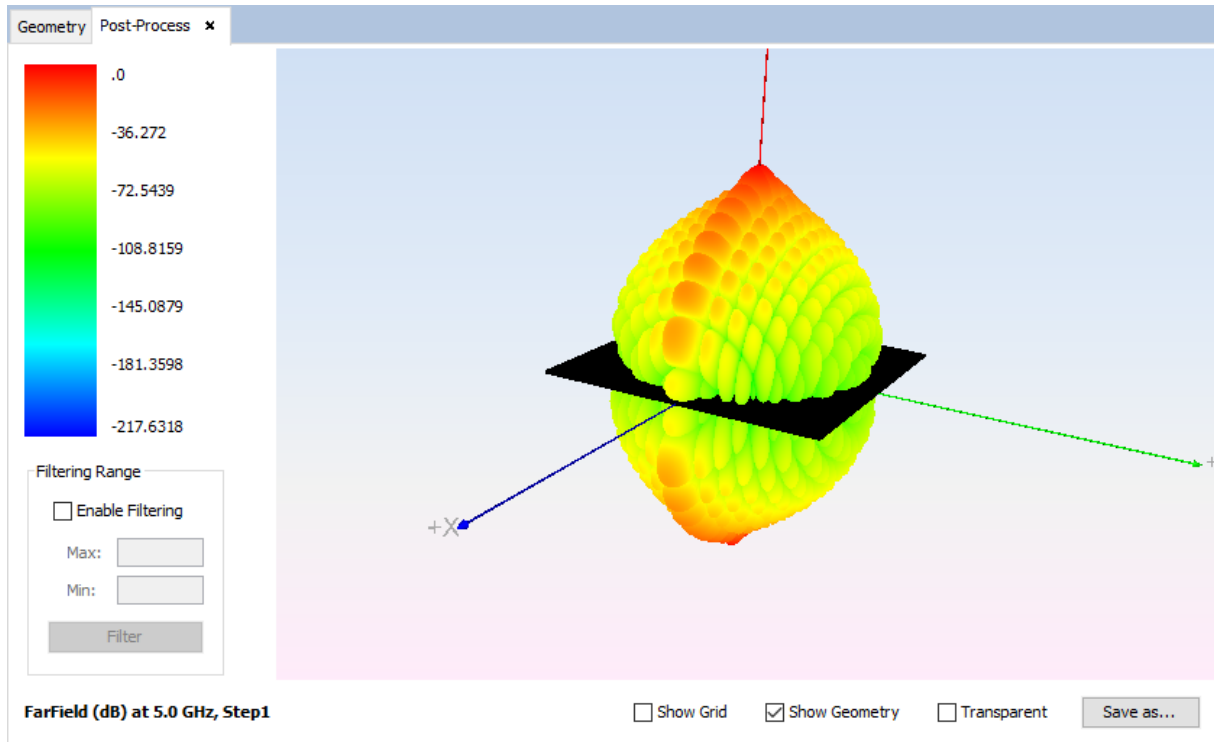


Figure 20: Step 4

5.5. Example 5: Text File trace

Step 1: Select the "Text File" option on "Post-Process" window.

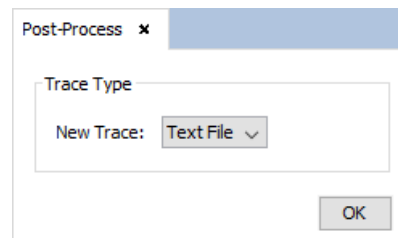


Figure 21: Step 1

Step 2: Select the simulation results and the type and sub-type from it.

Step 3: Select the domain and apply the desired operations over the original results.

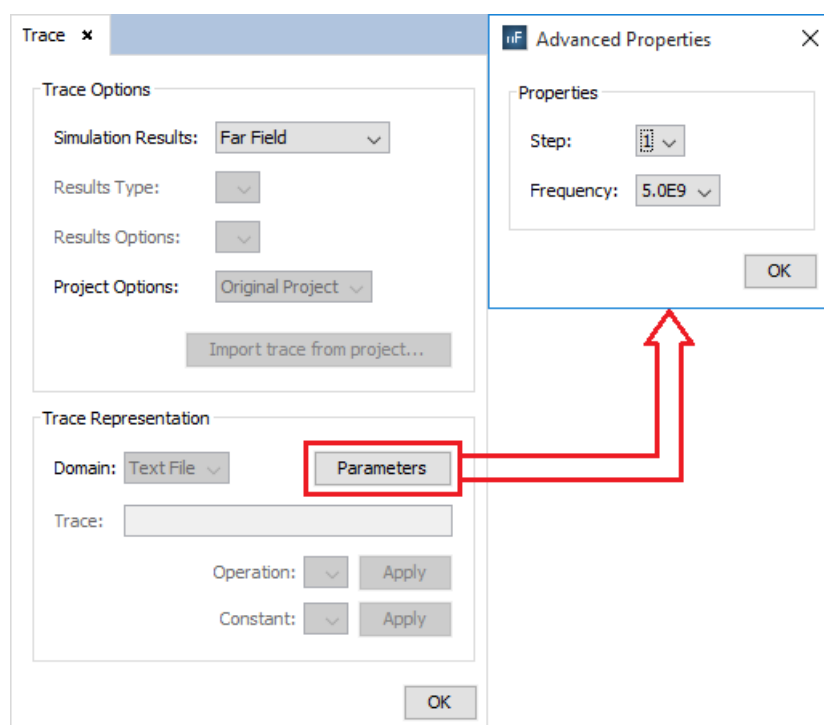


Figure 22: Step 2 and Step 3

Step 4: Click on "OK" and visualize the result.

| THETA (deg) | PHI (deg) | E_V (V/m) | | E_H (V/m) | |
|-------------|-----------|------------|------------|------------|------------|
| 0.000000 | 0.000000 | -.3768E-03 | 0.1311E-02 | -.1123E-08 | -.2132E-08 |
| 1.000000 | 0.000000 | -.3639E-03 | 0.1267E-02 | -.3585E-09 | 0.1294E-10 |
| 2.000000 | 0.000000 | -.3268E-03 | 0.1139E-02 | 0.6891E-09 | 0.1953E-08 |
| 3.000000 | 0.000000 | -.2701E-03 | 0.9449E-03 | 0.1830E-08 | 0.3424E-08 |
| 4.000000 | 0.000000 | -.2007E-03 | 0.7061E-03 | 0.2844E-08 | 0.4256E-08 |
| 5.000000 | 0.000000 | -.1267E-03 | 0.4504E-03 | 0.3526E-08 | 0.4391E-08 |
| 6.000000 | 0.000000 | -.5628E-04 | 0.2059E-03 | 0.3723E-08 | 0.3889E-08 |
| 7.000000 | 0.000000 | 0.3461E-05 | -.3100E-05 | 0.3370E-08 | 0.2911E-08 |
| 8.000000 | 0.000000 | 0.4738E-04 | -.1586E-03 | 0.2502E-08 | 0.1682E-08 |
| 9.000000 | 0.000000 | 0.7289E-04 | -.2512E-03 | 0.1250E-08 | 0.4510E-09 |
| 10.000000 | 0.000000 | 0.8015E-04 | -.2807E-03 | -.1844E-09 | -.5605E-09 |
| 11.000000 | 0.000000 | 0.7168E-04 | -.2551E-03 | -.1564E-08 | -.1195E-08 |
| 12.000000 | 0.000000 | 0.5185E-04 | -.1888E-03 | -.2661E-08 | -.1385E-08 |
| 13.000000 | 0.000000 | 0.2597E-04 | -.9976E-04 | -.3297E-08 | -.1159E-08 |
| 14.000000 | 0.000000 | -.5846E-06 | -.6496E-05 | -.3377E-08 | -.6318E-09 |
| 15.000000 | 0.000000 | -.2318E-04 | 0.7473E-04 | -.2904E-08 | 0.2589E-10 |
| 16.000000 | 0.000000 | -.3856E-04 | 0.1320E-03 | -.1976E-08 | 0.6207E-09 |
| 17.000000 | 0.000000 | -.4511E-04 | 0.1591E-03 | -.7711E-09 | 0.9768E-09 |
| 18.000000 | 0.000000 | -.4294E-04 | 0.1554E-03 | 0.4904E-09 | 0.9683E-09 |
| 19.000000 | 0.000000 | -.3358E-04 | 0.1254E-03 | 0.1583E-08 | 0.5422E-09 |
| 20.000000 | 0.000000 | -.1952E-04 | 0.7756E-04 | 0.2314E-08 | -.2736E-09 |
| 21.000000 | 0.000000 | -.3715E-05 | 0.2178E-04 | 0.2557E-08 | -.1377E-08 |

Export

Figure 23: Step 4