

AN-SOF Configuration Guide

Here you will find tips about how to configure AN-SOF before a simulation is run.

How to speed up a simulation

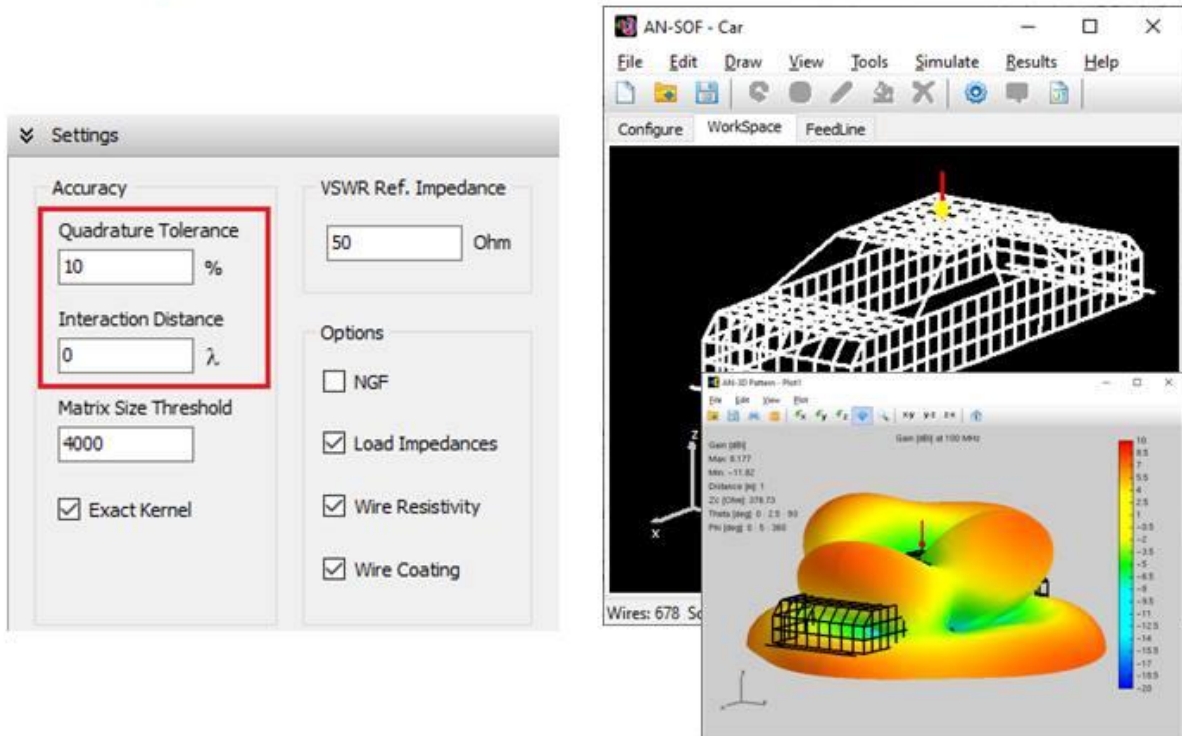
There is always a trade-off between speed and accuracy. However, we often need to prioritize speed in the first simulations of an antenna model. Here are some tips to speed up the calculations.

1. Start with the minimum number of segments (10 segments per wavelength). AN-SOF sets the minimum number if you write "0" (zero) as the number of segments on any wire. In a wire grid, use one segment per cell side if the electrical size of each cell is < 10% of the wavelength.
2. Set the Quadrature Tolerance between 5% and 10% in Configure tab>Settings panel. This parameter only has an appreciable effect when there are parallel wires very close to each other (about two wire radii apart).
3. Set Configure tab>Settings>Interaction Distance = 0. It also only affects parallel wires that are very close to each other.
4. To calculate the gain, directivity and efficiency usually it is enough to set a spatial resolution of 5 or 10 deg in the far-field. Configure tab>Far-Field panel>Theta Step = 5 and Phi Step = 10 deg.
5. Last but not least, just calculate what you really need. The "Run ALL" option will calculate everything, currents, far and near fields. If you only need the currents and the far-field, click on "Run Currents and Far-Field (F11)". If you are only interested in the input impedance, go to Simulate>Run Currents in the main menu.

The example in this figure shows that we can run a simulation more than 3 times faster, especially by setting the Interaction Distance to zero. You will find the "car.emm" project in the Examples folder which is installed together with AN-SOF.

Quadrature Tolerance	Interaction Distance	Input Impedance	Simulation Time
0.1%	1 λ	12.62 - j 168.6 Ω	150s
0.1%	0	12.56 - j 168.4 Ω	46s
10%	1 λ	12.81 - j 167.8 Ω	140s
10%	0	12.76 - j 167.6 Ω	42s

Car.emm project | Intel Core i7 CPU @ 1.30GHz - 8GB RAM

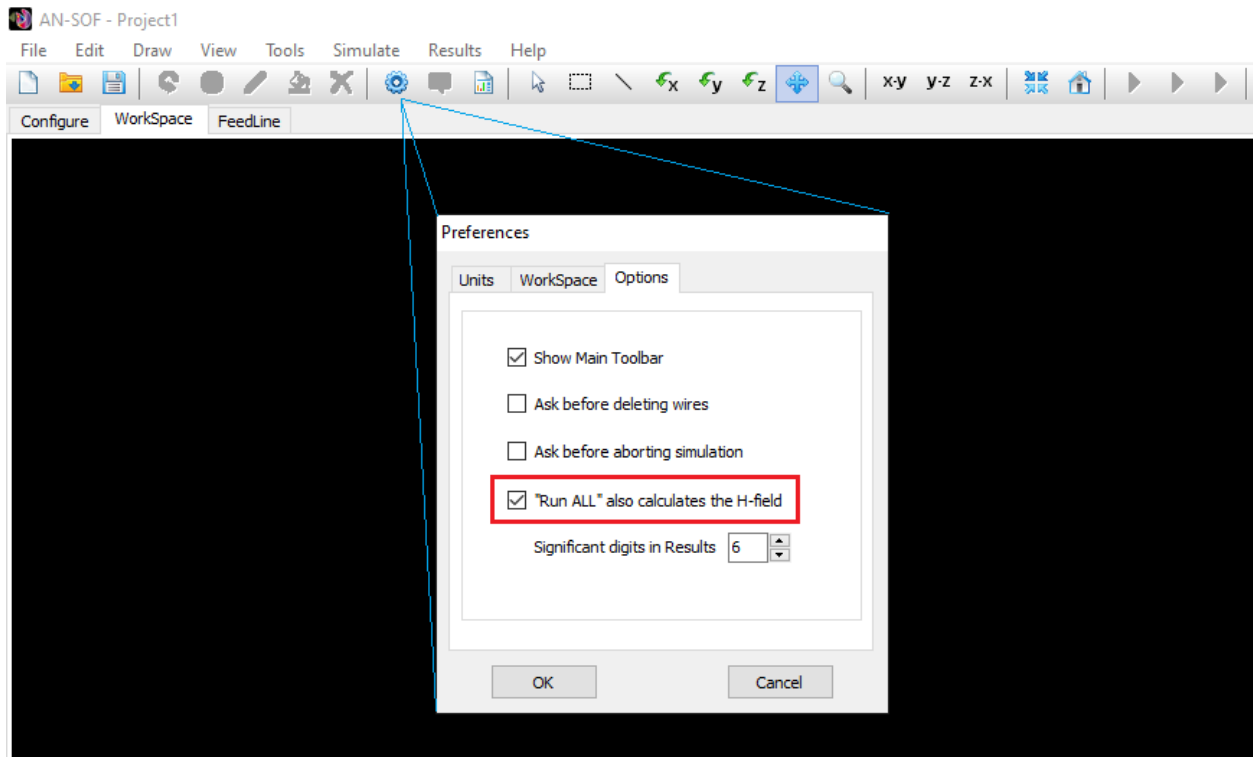


H-field option in Preferences

We see that most of the time we are interested in calculating only the E-field in antenna projects when we are talking about the near field. For this reason, we have added an option to enable or disable the automatic calculation of the H-field when we click on the "Run ALL" (F10) button. Go to Tools > Preferences > Options tab.

If we are only interested in the near field and we don't want to waste time calculating the far field, we can click on the "Run Currents and Near-Field" (F12) button.

In the "Simulate" menu we also have the options: "Run Far-Field", "Run Near E-Field" and "Run Near H-Field" to calculate each field separately.



Setting the radiation pattern center

From the far field point of view, the whole structure of an antenna and its surroundings is reduced to a single point at the origin $(X,Y,Z) = (0,0,0)$. So the standard practice of superimposing the 3D radiation pattern to the antenna structure is just a means to facilitate the interpretation of the directional characteristics of an antenna.

For this reason, you can move the phase origin of the 3D radiation pattern to the desired point in order to get a better view of the antenna orientation versus its radiation pattern. Go to the Configure tab > Far Field > Origin and set the X_0 , Y_0 , Z_0 coordinates of the radiation pattern center (see Section "4.3 Far-Fields" in AN-SOF user's guide).

