

Software
TecAt Plus 6
Volts and Bolts OÜ / Oficina de Mydia
Using the Wizards
First revision - 28/03/2016

Introduction

This document shows some examples of configuration and use of **TecAt Plus 6** “wizards” (also available on **TecAt Pro 6**) for the automatic generation of both regular and irregular grids.

Of course, it’s always possible to build the grid one electrode at a time, using the button “New” just over the electrodes table on module Grid 2, but using the wizards has the advantages of high speed, preventing typing errors or mistakes when setting the electrode inclination - both can cause math errors that are difficult to locate when the grid has tens of electrodes.

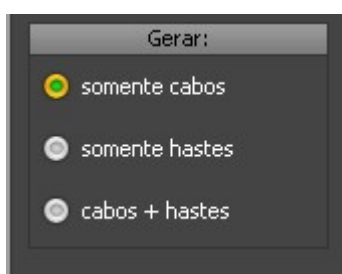
Additionally, the wizards also do the calculations of the electrodes coordinates for grids with geometric distribution of mesh sizes - see bellow.

1. Electrodes validation

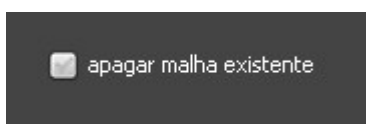
First, a note about the “Validate” button you find at the right of the electrodes table, using an example: say you have a grid with a “L” plan shape - you’ll generate two rectangles (see below) to form the L, but both wizards will add one cable at the junction of the rectangles, which would be wrong and could cause a math error; so, each time you run a wizard, the “Calculate” button is hidden and you must click on “Validate” to make it appear again, then **TecAt** will run all the electrodes of the table and verify if there’s no conflict with another one.

2. Wizards configuration

2.1 - Generate cables and or rods



2.2 - Erase (or not) the existing grid



Normally this option is kept checked, you’ll only want to keep the current grid when constructing some grid with an irregular shape - let’s say you want a “L” shaped grid: generate one rectangle then generate another without erasing the first; otherwise, if your grid is rectangular, you’ll typically generate one grid, run it, if the result isn’t good you come back to the wizard and generate another one, erasing the first.

2.3 - Mesh sizing with geometric ratio



On big grids, with more than 7 or 8 cables in each direction, it may be possible to save a significant amount of cables (and, of course, connections and labor) if their disposition follows a geometric pattern, with bigger meshes at the center and smaller at the borders. It works because the cables (and rods) get concentrated where the potentials gradient is bigger.

It goes like that: if R is the ratio and X is the dimension of the first mesh from the border, the cable will be positioned at coordinates X , $X.R$, $X.R^2$, $X.R^3$ and so on till the center of the grid, then they start to get smaller again.

2.4 - Default materials



TecAt saves on its configuration file the default materials that will be used on the wizards (also, separately, the materials used on module Grid 1); at each run of the wizard, TecAt uses one

dimension of cable and one of rod - that is, if you want part of the grid to use 50 mm² cables and another part use 70 mm² cables, run the wizard a first time, then change the default cable and run a second (without erasing the existing grid!).

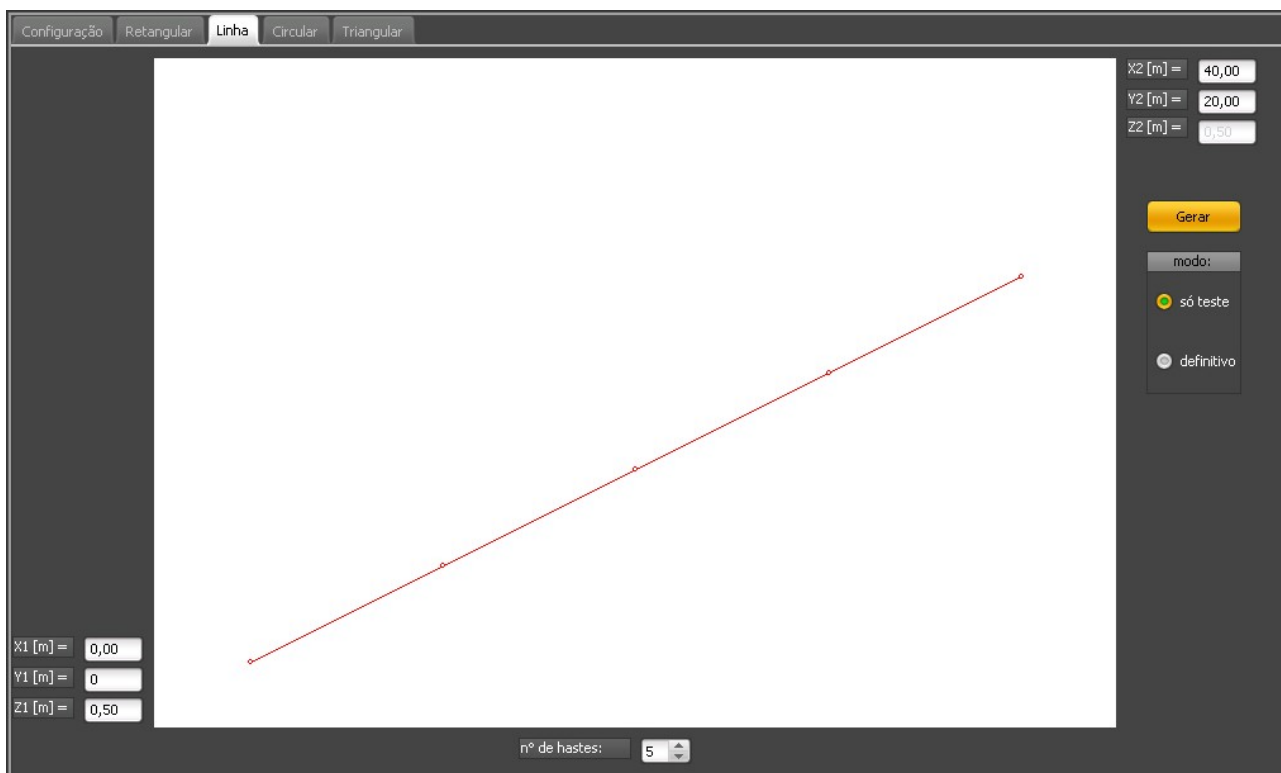
2.5 - Option “test only” x “definitive”



At the wizards' screen, select “test only” and click on Generate button to check if that's what you want - the electrodes are drawn on the screen but not added to the table. If you select “definitive” then they are drawn AND added to the electrodes table.

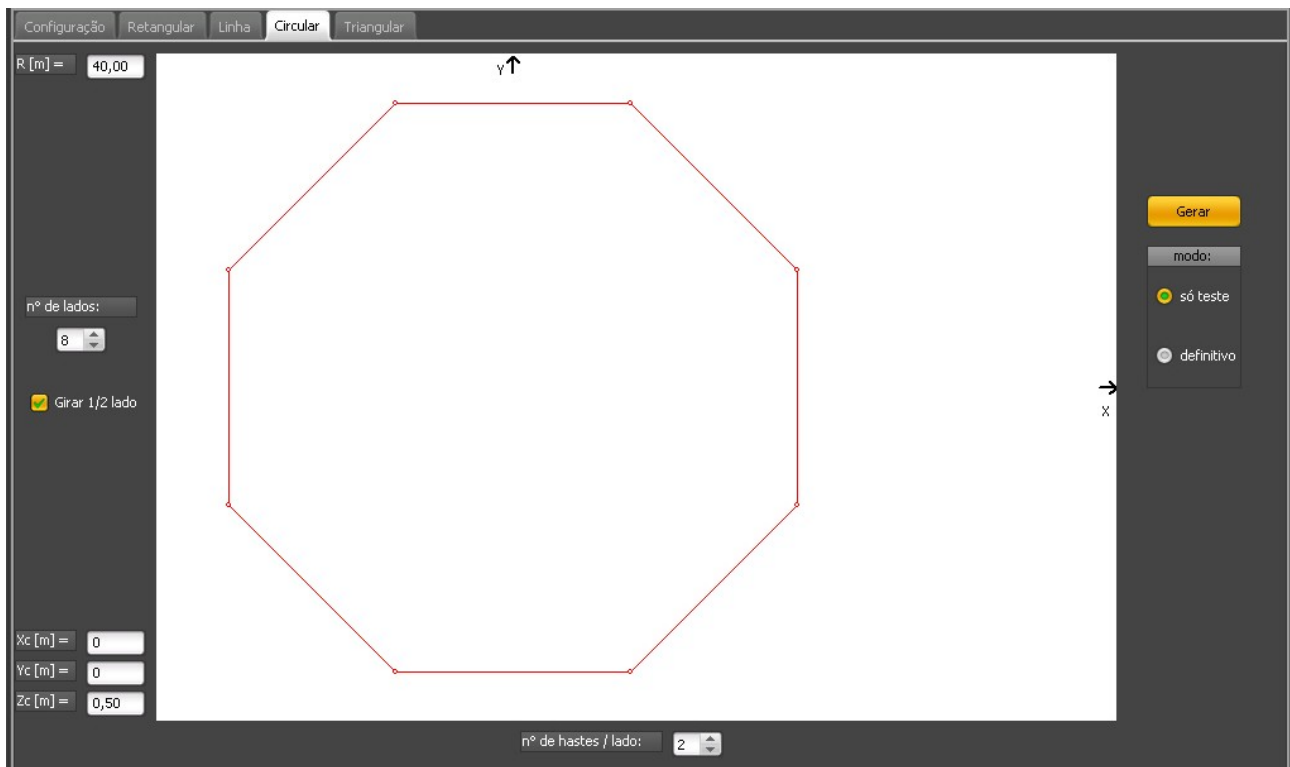
3. Wizard “line”

Generates a horizontal line of a cable and/or rods - the use is straightforward, just enter the coordinates and the number of rods you want:



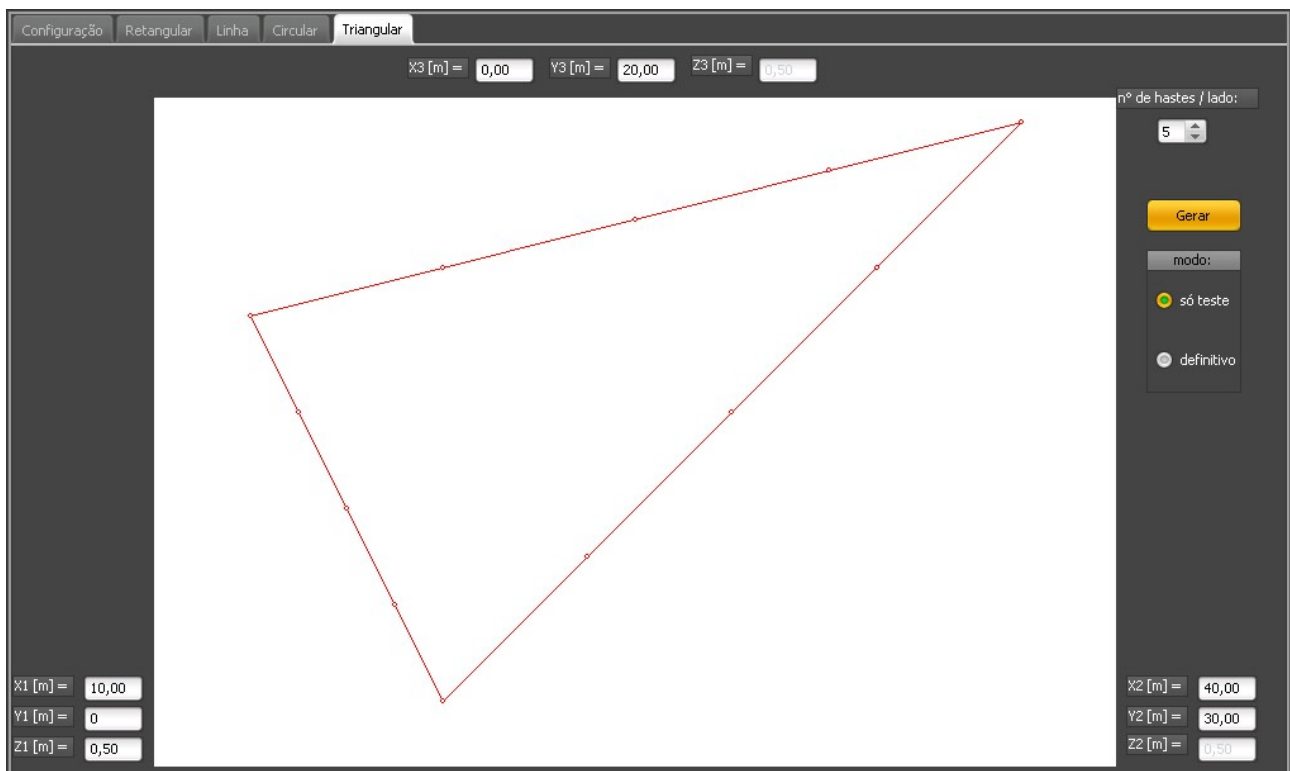
4. Wizard “circle ring”

There's no direct formulas to calculate the resistance of circular electrodes, so **TecAt** will actually generate a polygon with “N” sides; the bigger the number of sides, more closely the result will approach a real circle, but the table will get a little messy with cable segments.



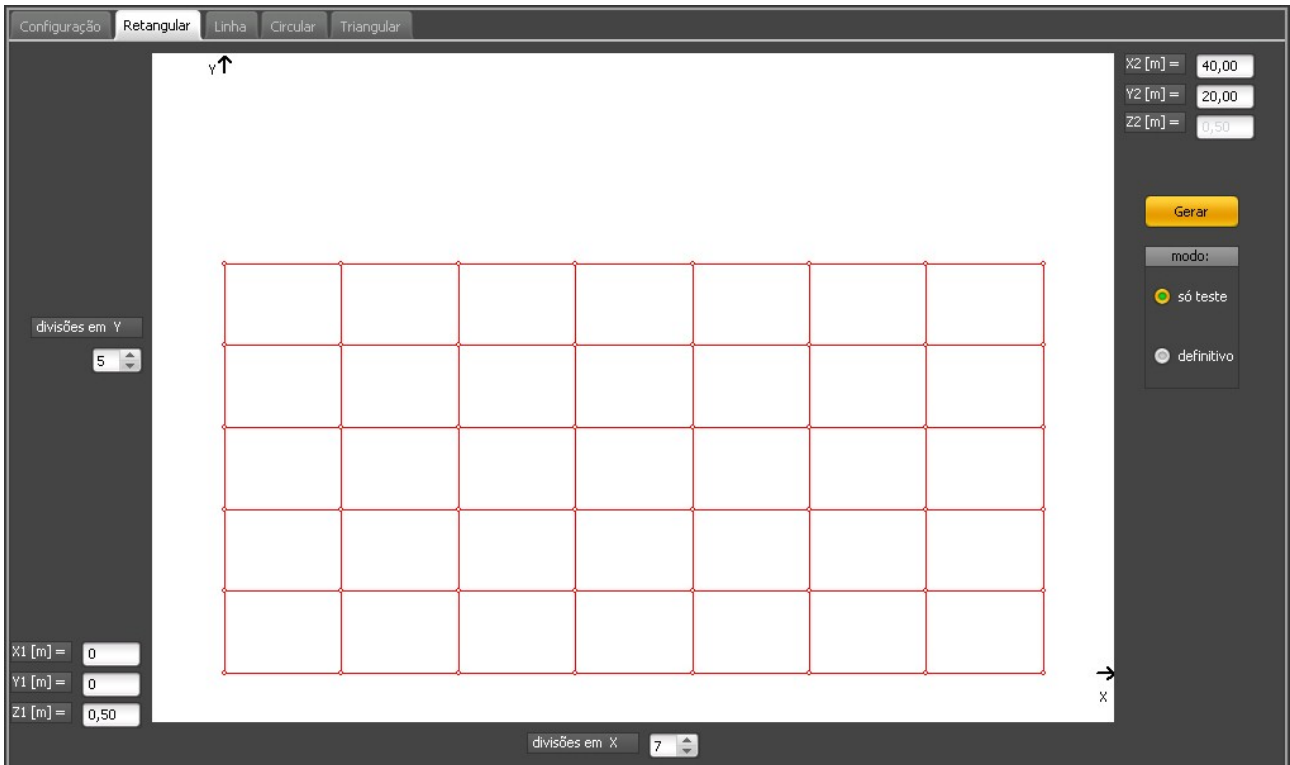
5. Wizard “triangle”

That’s the same as running three times the “line” wizard - enter the coordinates of the corners and the number of rods for the sides:

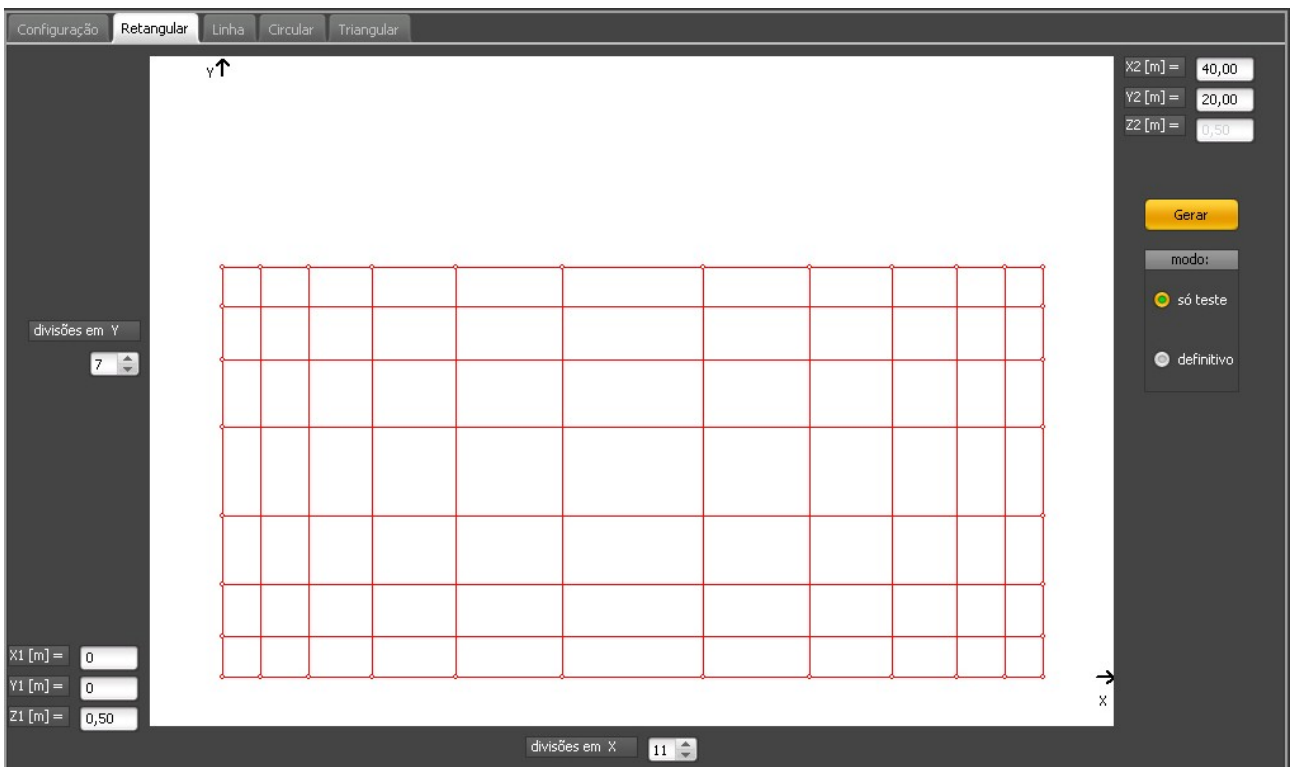


6. Wizard “rectangle”

Example: rectangular grid with cables and rods at every node, with regular distribution:

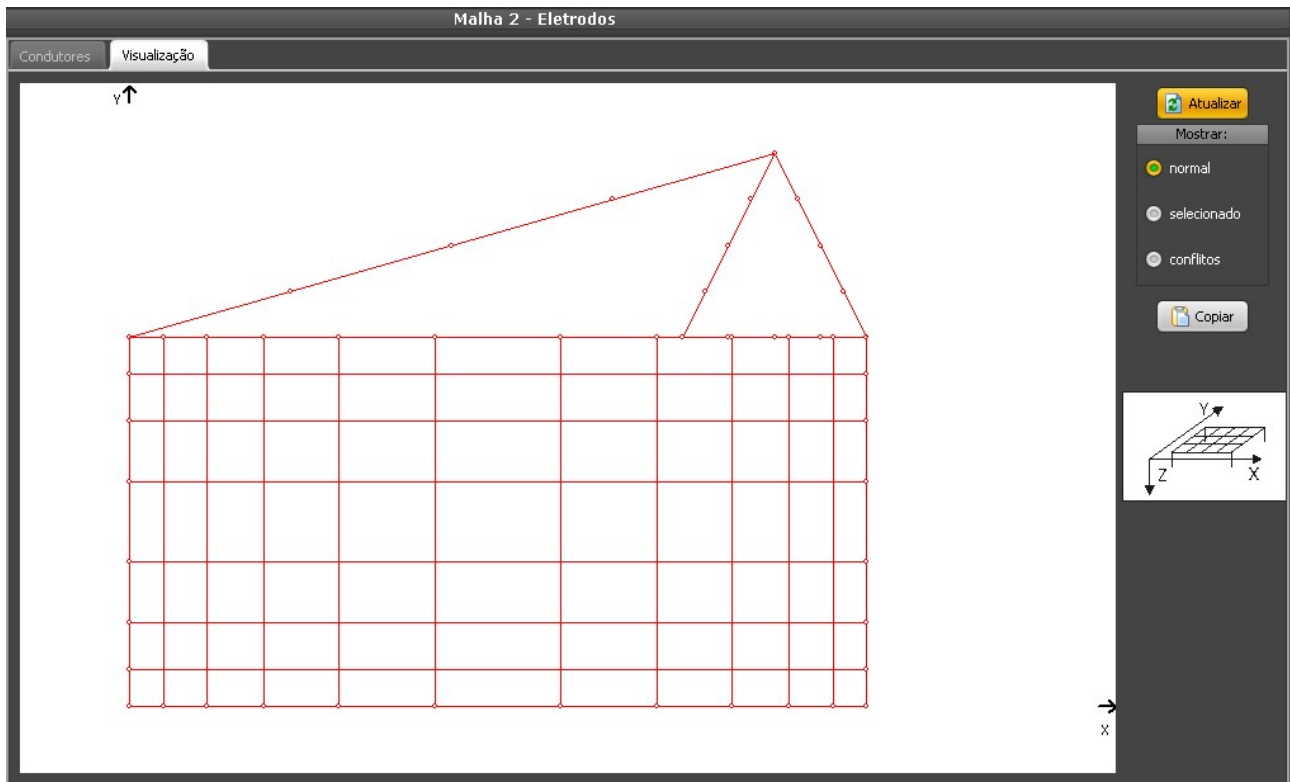


Example: rectangular grid with cables but with rods only at peripheral nodes, with geometric distribution of ratio = 1.3:



7. Mixing the wizards

If you don't check the "erase existing grid", you can build complex shaped grids using different wizards:



8. Conclusion

With a bit of practice, it's possible to quickly generate from simple to complex grids.

On substation grids, there will be several additional cables for grounding structures and equipments, with a section under the soil and sometimes with an extra rod at the connection with the grid - they will contribute with a very small part of the resistance, so the quickest procedure is to ignore them at first, use the wizards at will until you get a good result for the grid, then add these elements using the "New" button over the electrodes table and run again the calculations to get the final result and reports.

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