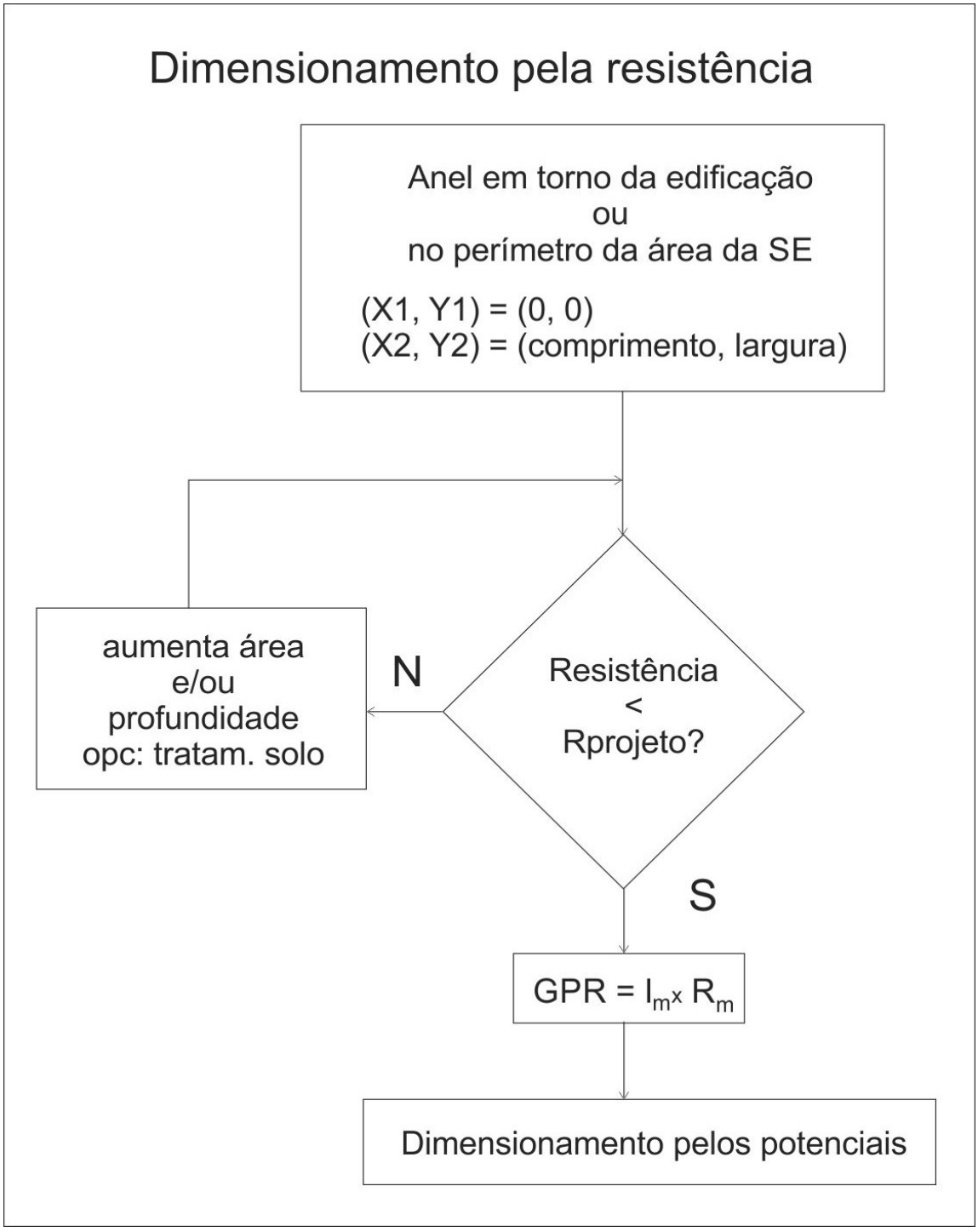
TecAt 6 - Tutorial - Grid 2 - part 1

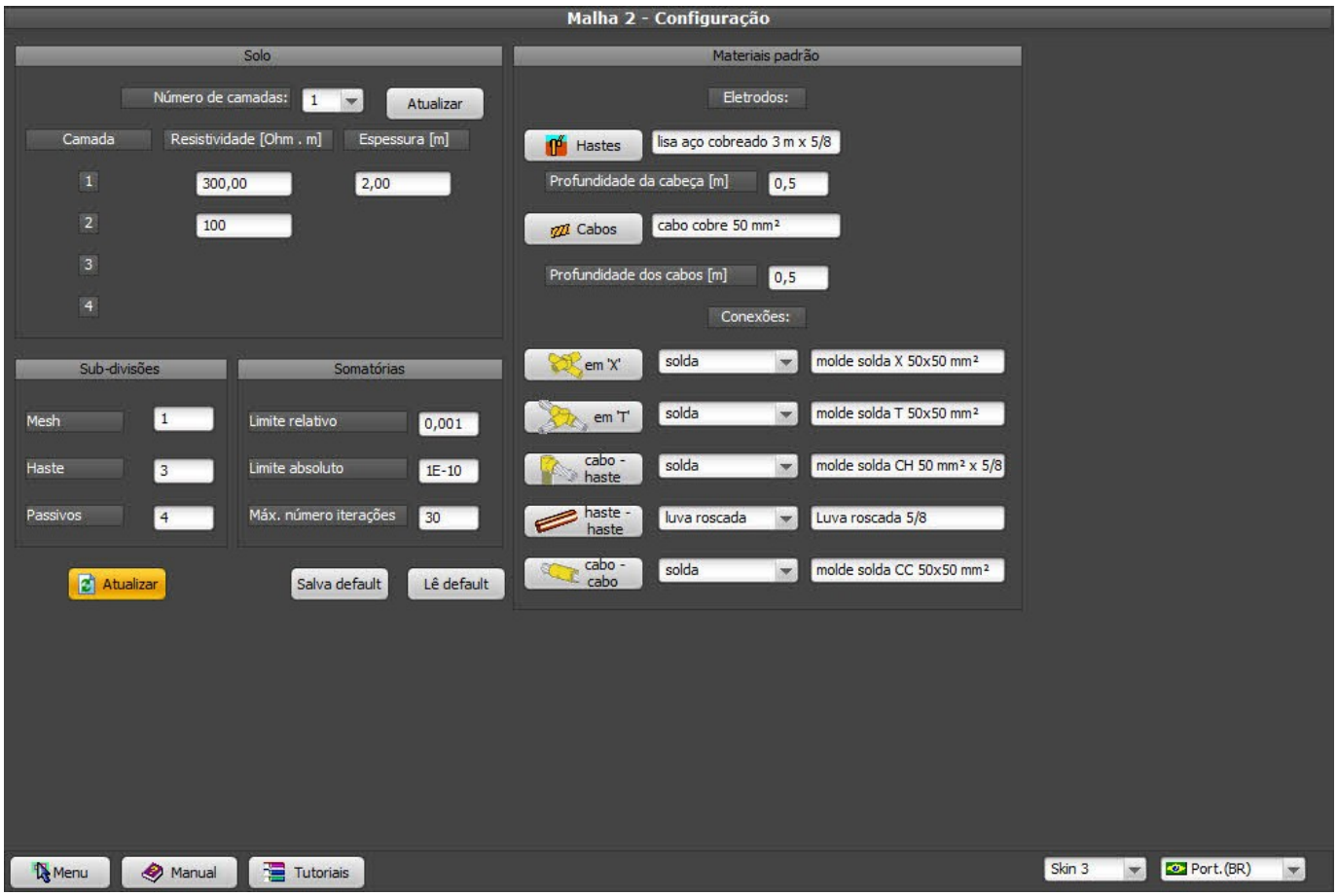
Note: items on this tutorial that refers to touch, step and surface potentials are related only to version TecAt Plus.

1. Design sequence



2. Grid 2 - Configuration

At the Menu bar, select Grid 2 / Configuration:



Let's use the same 2-layer soil from the Grid 1 tutorial: 300 OHm.m for the first layer and 100 Ohm.m for the second, with 2 meters thickness for the first layer.

Do not change the numerical parameters, they are already balanced for optimal result - you'll only need to change that in very specific cases.

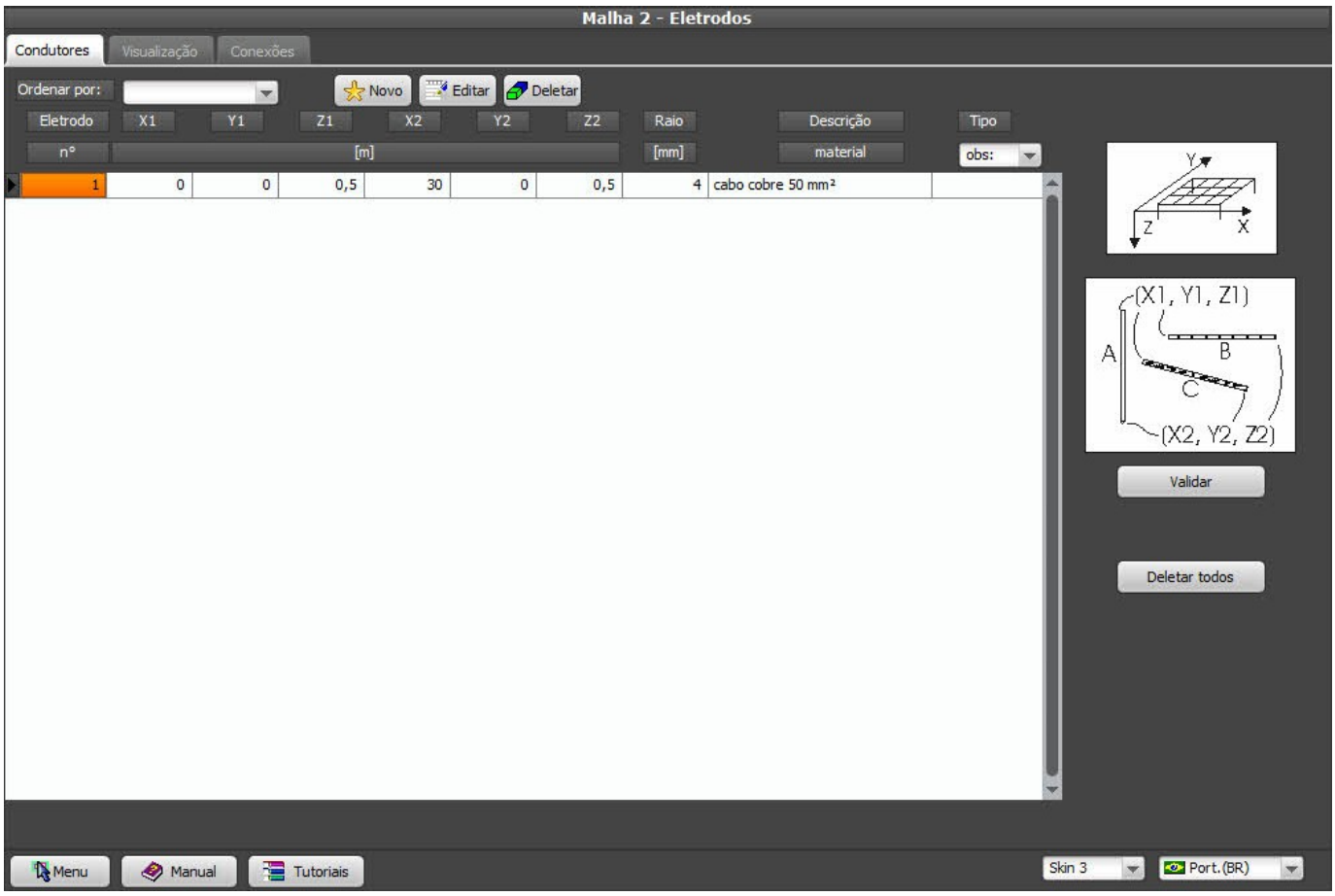
3. Wizard configuration

Most grids - or at least some parts of a bigger grid - have a regular shape that can be generated automatically, that's what the Wizards do (we'll use them later on).

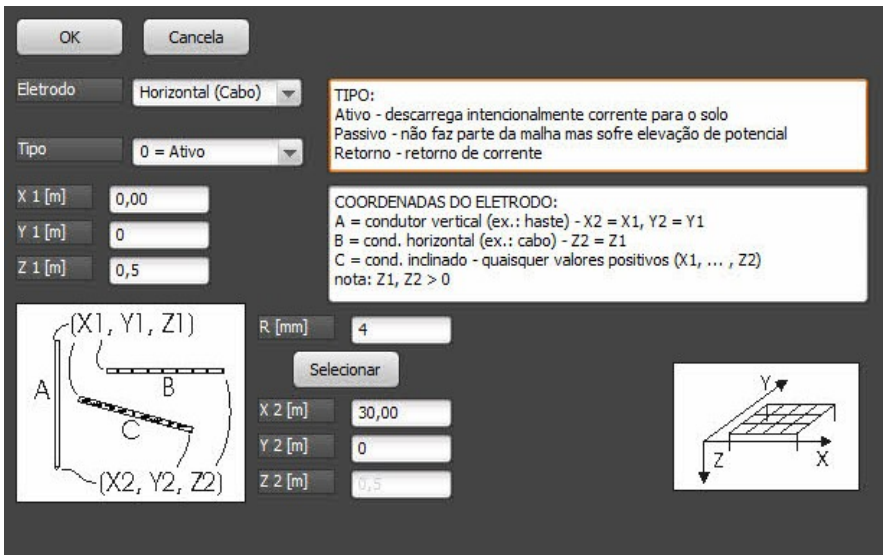
While Grid 2 allows several different electrodes dimensions, the usual is to have one rod lenght and one cable section only; at the Wizards configuration screen (menu bar: Grid 2 / Wizards / configuration), we'll set one rod, one cable and the 5 possible connections to be used as default:

4. Manually setting each electrode

We can define the electrodes one by one - for example, let's say we want a cable fro (0,0) to (30,0) at a depth of 0.5 meters:



to define it, click at New and the diaog bellow will be shown:

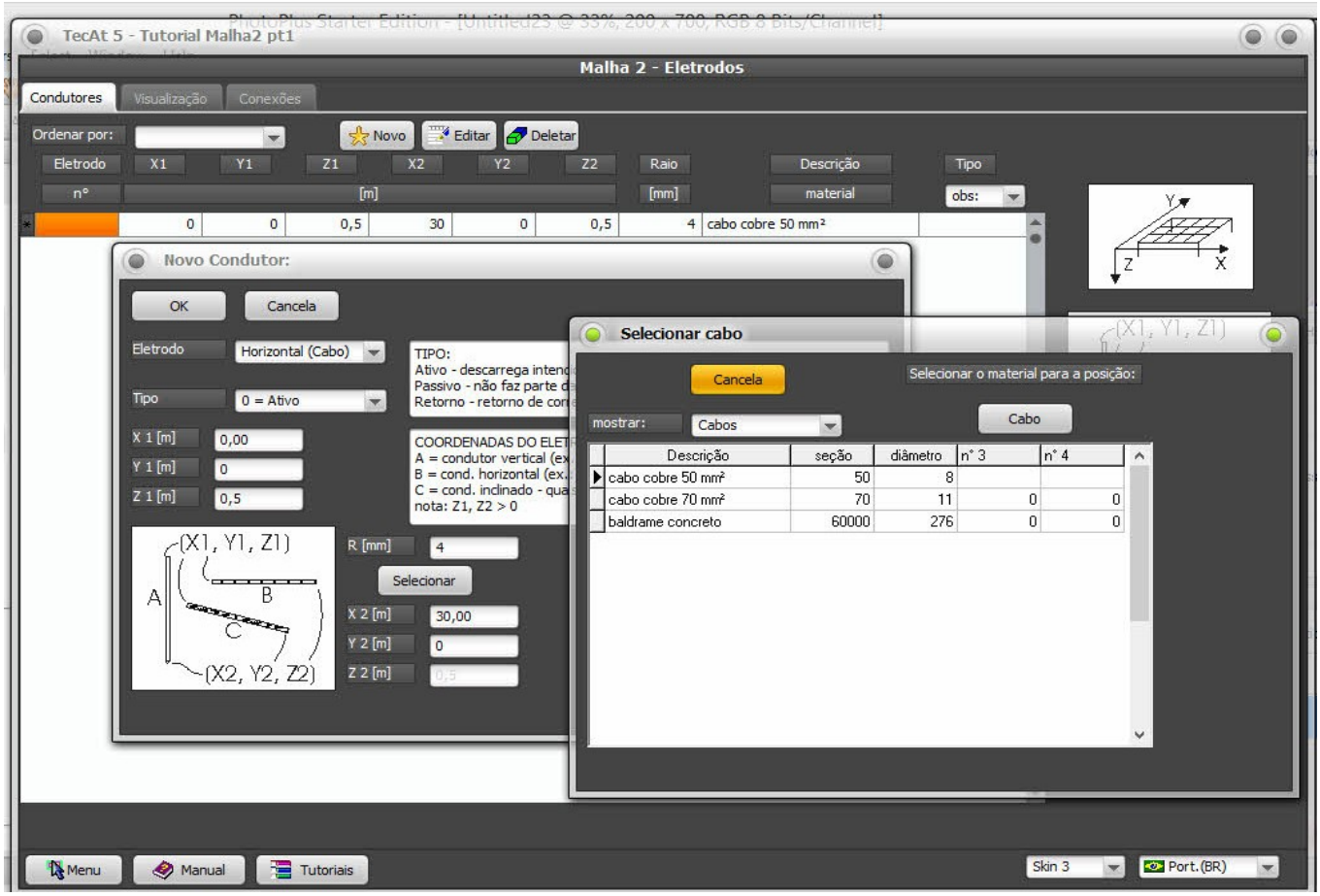


enter the data:

- electrode: Horizontal (that is, Z1 = Z2)
- tipe: Active
- X1 = 0
- Y1 = 0
- Z1 = 0,5 (grid depth)
- X2 = 30
- Y2 =0
- Z2 = Z1 - you can change that now, as we already said it's horizontal
- R (cable radius) - we don't enter it directly; instead, click at the Select button and chose one cable from the materials database (see below)

- click at OK

All the electrodes that will be used must be available on the materials database (at the menu bar: Materials); every time you click at a "Select" button, TecAt will present all materials listed for its "Group", that is, if you're selecting a cable, you get a table with all cables registered - just select the desired and Confirm:



5. Wizards - automatic generation of grids

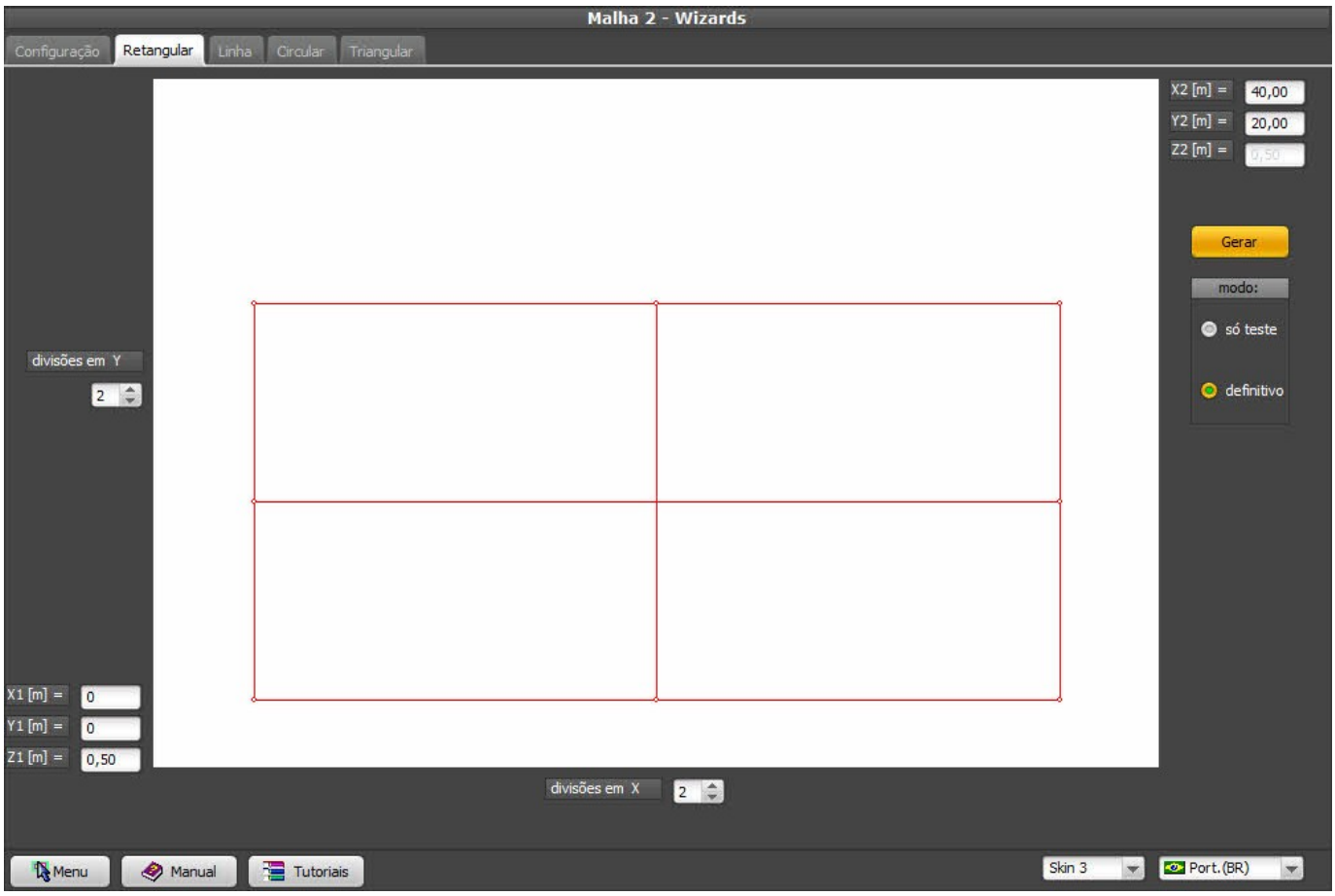
You can enter all the electrodes as seen above, but it's a slow process and it's easy to make some mistakes; to solve that, TecAt has some auxiliaries - Wizards - to generate the grid for you; use them while calculating the grid and, when you're satisfied with the results, you can then add the extra small electrodes tha the wizards can't generate, like the grounding cables from equipments ans metallic structures.

Select Wizards at the Menu bar, then the Configuration tab:

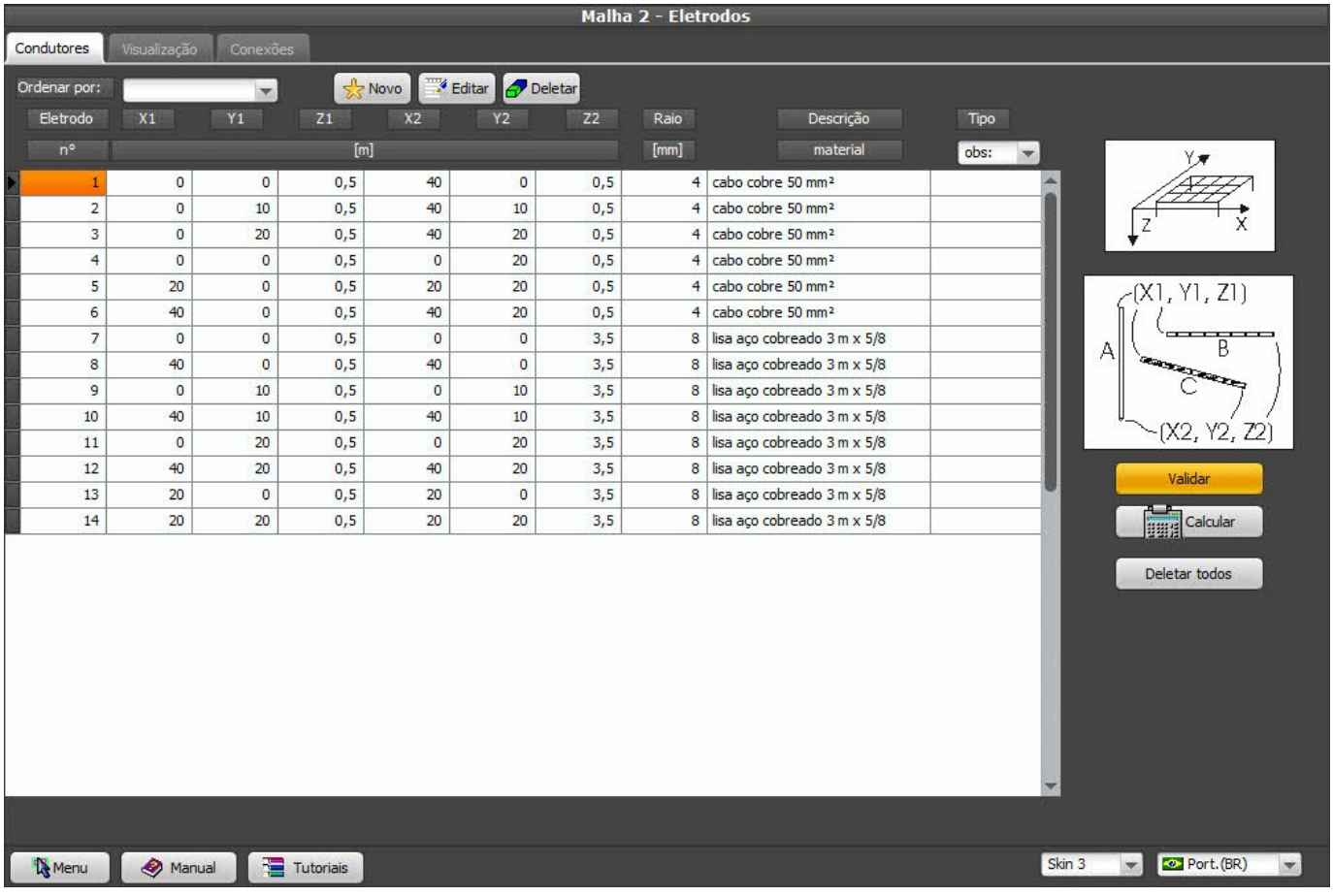
Select the options we'll use for our example:

- generate: cables and rods
- rods: only at the peripheral nodes
- distribution: inear (we'll see the geometrical distribution later on)
- electrodes tipe: Active (that is, intended to dissipate the current to soil)
- check "Erase existing grid" (empties the electrodes table each time the wizard is run)

Select the Rectangular tab and generate a grid with two divisions at X and Y axes, with X1 = 0, Y1 = 0, X2 = 40 and Y2 = 20, with Z1 = Z2 = 0.5 meters; if you check the option "test only" and click on Genarate, the wizard will draw the grid, but no electrode will be actually added to the table - for that, you'll need to check "definitive":



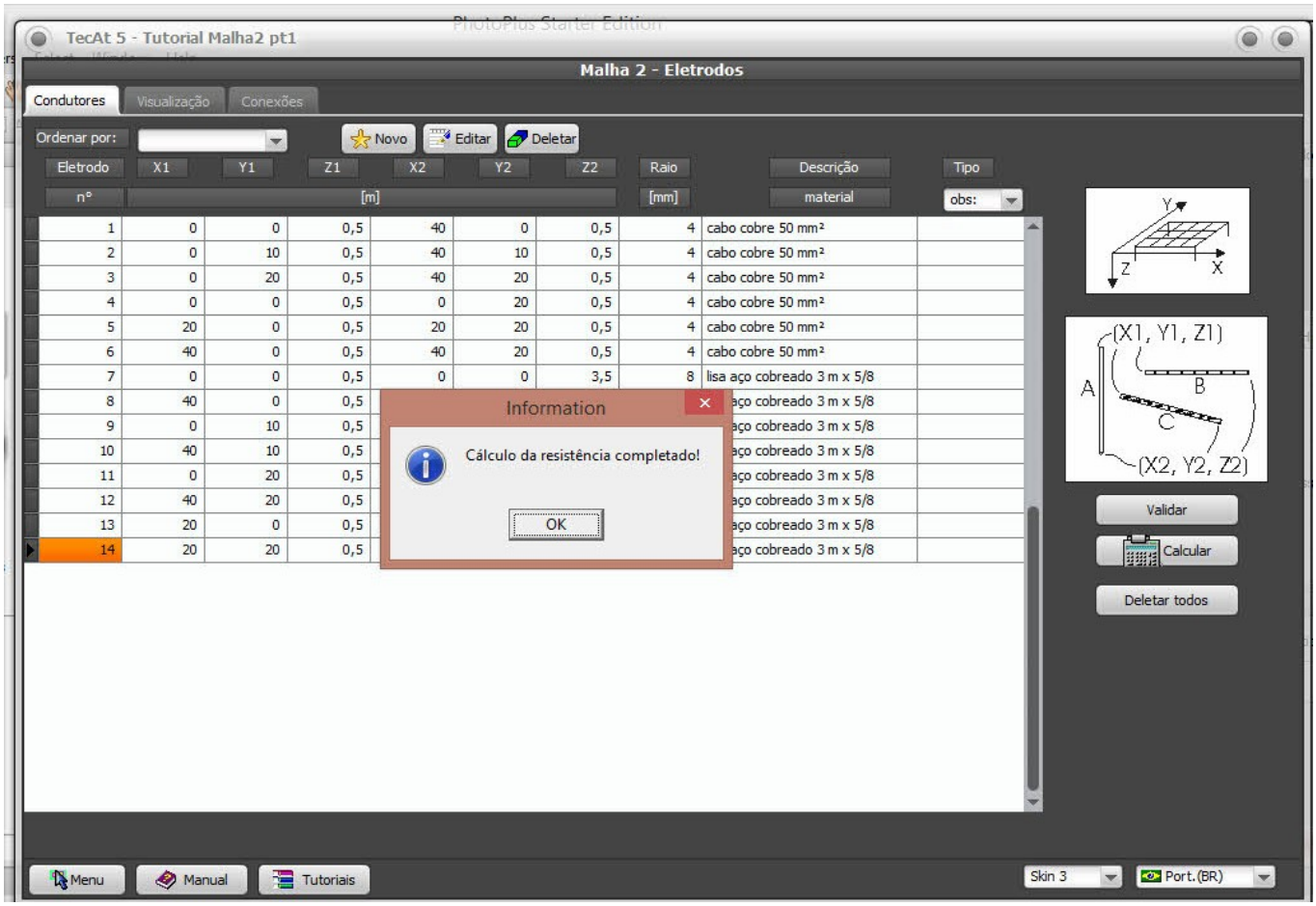
Back to the screen Grid 2 / Electrodes, we can see the grid electrodes:



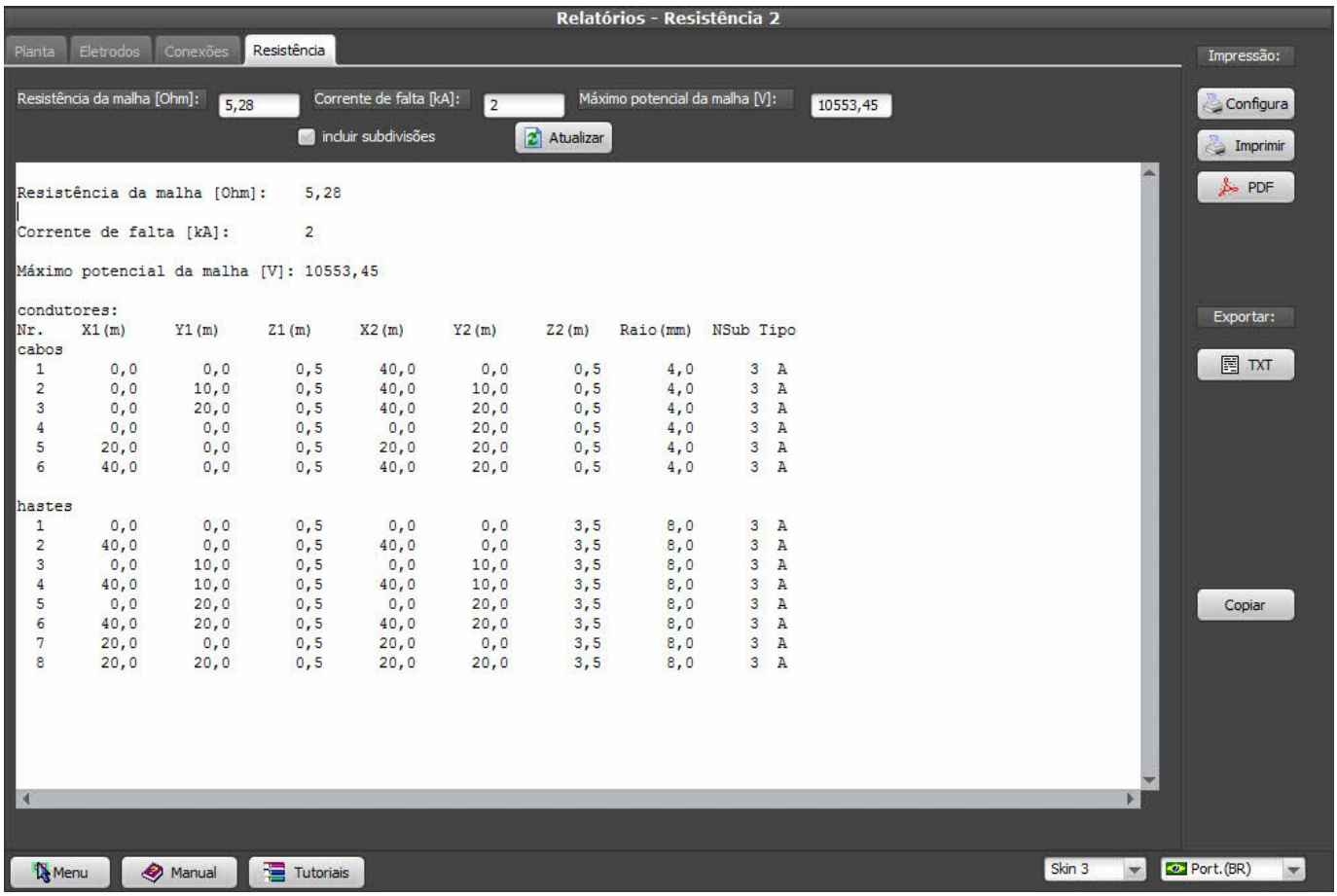
Click at the Validate button to check and reorder the electrodes and also make the Calculate button visible.

6. Grid resistance calculation

Clic, at Calculate, TecAt will do the math and alert you when it's done:



Select Reports 2 / Resistance:



If the resistance isn't satisfactory, just go back to the wizard and generate another grid; TecAt Plus users also has available the grid dimensioning by the potentials criteria, see at **Tutorial TecAt 6 - Grid 2 - part 2** the following items:

6. Calculation sequence for grid dimensioning by potentials

7. Admissible (Tolerable) potentials

8. Analysis of grid and surface potentials in 3 Dimensions

9. Analysis of Touch and Step potentials in 2 Dimensions

10. Typical cycle of design

11. Wizards - generating meshs with geometric progression dimension

12. Alternatives to control dangerous potentials at the grid external area