



MICROPROJECT EC2B

Finite elements method in low frequency electromagnetism

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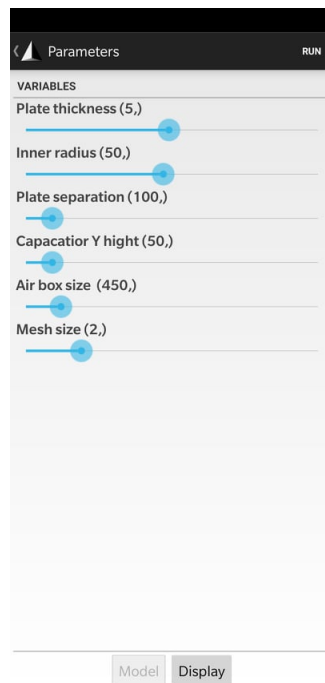
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1 Problem description

This .zip file contains the model of a cylindrical capacitor which is modifiable to a certain extent. This app let you calculate the capacity and induction of the defined capacitor with a given potential difference. You may also observe the potential V , the electric field e , and the electrical induction d . This program was made in the context of an engineering school micro-project for the finite elements method in low frequency electromagnetism class.

2 Parameters

The geometry of the capacitor is fixed but it is possible to modify a few parameters in order to test some configurations out. Here is a list of all the modifiable variables that you can change via a slider in the *parameters* menu :



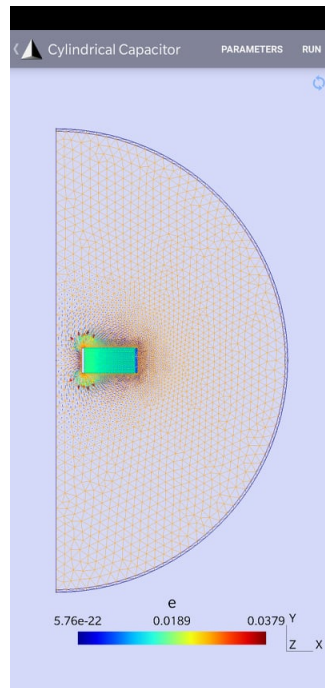
Those variables act directly on the geometry, you may then tweak them to match your desired design. Please note that the problem is axisymetrical, so be careful with your parameters. Note also that the size of the domain does not adjust automatically, please modify the *Air box size* accordingly.

3 Meshing

Once your design set, you may choose your mesh density. I advise to keep it fairly low, with a *Mesh Size* of around 1, as your smartphone won't be able to store all the data needed for a large number of nodes and elements. Note also that the processing time can be long if you bring this parameter to low. The advised size (which is the default preset) would already allow great result tolerances and minimised processing time.

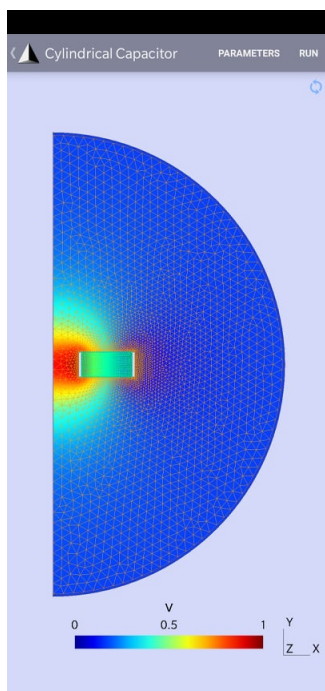
4 Results

Now that your problem is set up, you just have to press *Run* on the top right corner. This may take a while, but be patient, if you chose your mesh size wisely, it shouldn't crash. It is then possible to visualise the previously mentioned fields and potentials by ticking the right box in the *display* tab in the bottom of the *parameters* menu. You should get something like this by default :



(Electrical induction d)

By the ticking the box v , you should get :



(*Potential V*)

This little guide is now complete, may this app be useful and have fun.