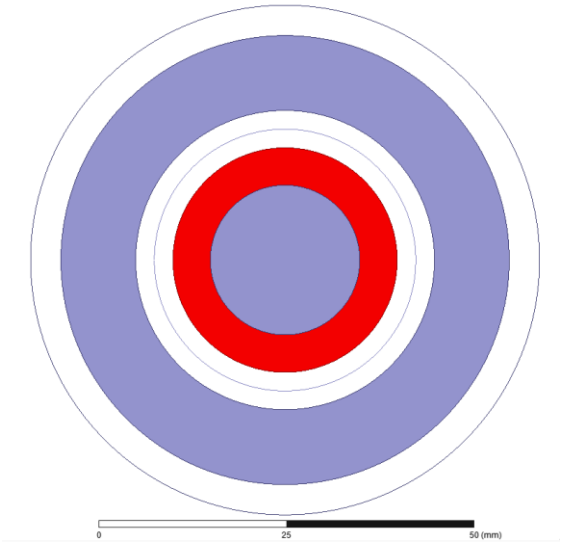
Mehmet Kaan Mutlu

Motor Design Assigment-4

- Induced Voltage-

Diametrical oriented magnet's design notes and corresponding results:

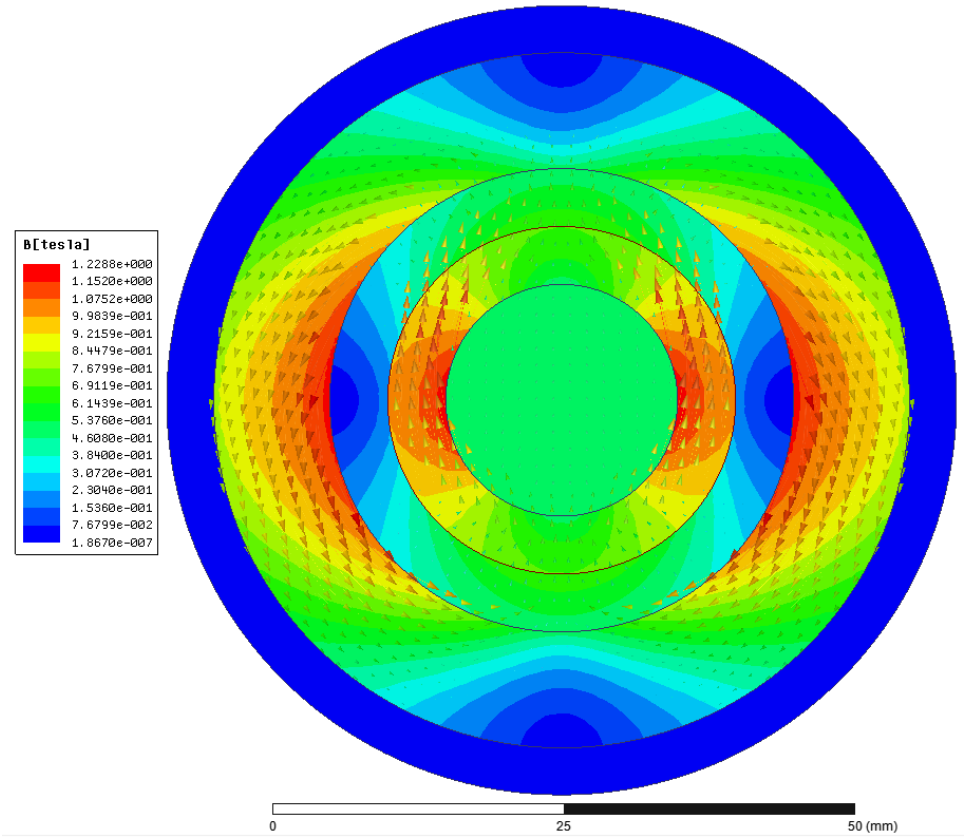


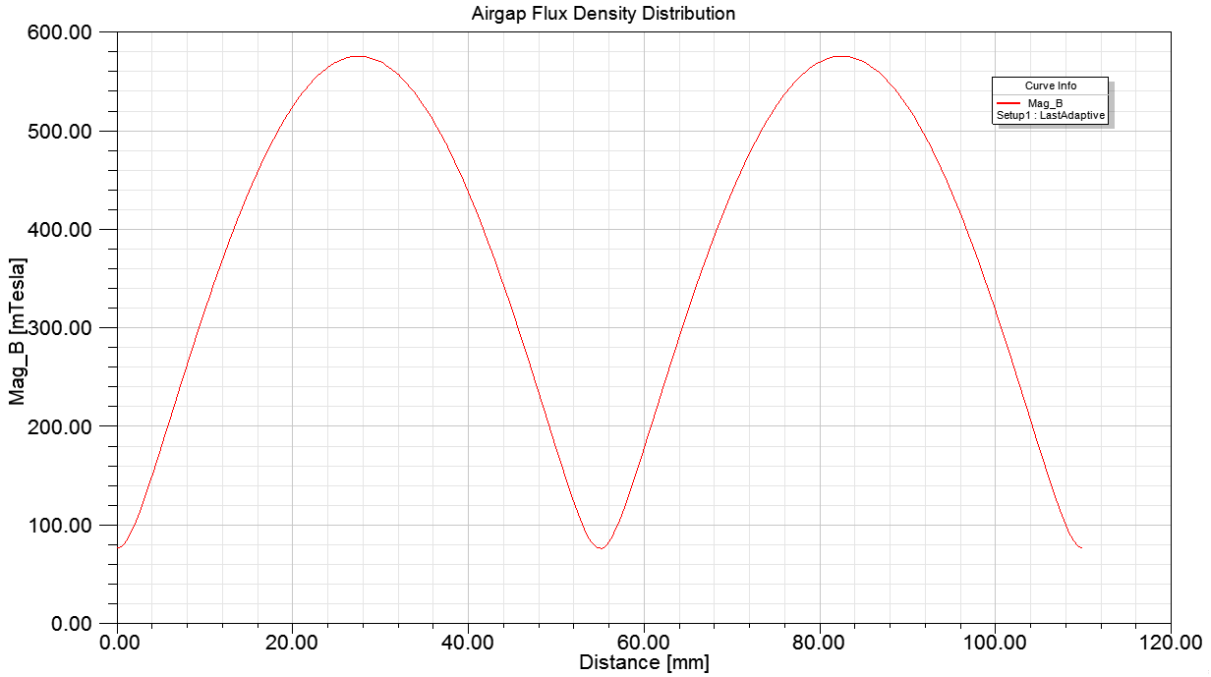
Outer circle is the boundary.

Rotor and stator's cores are defiened as realistic materials and colored as light blue.

Magnet is in red color and defined as a single volume. Its orientation is selected as y axis.

The circular line between magnet and the stator is created to be able to observe the air gap flux density distribution.

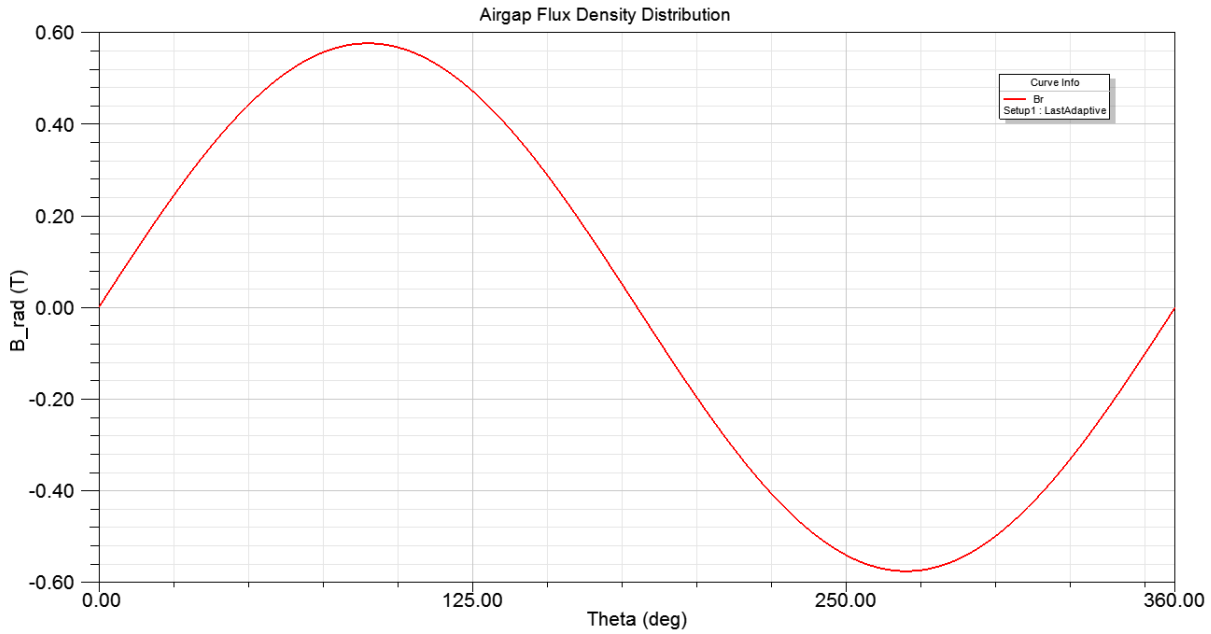


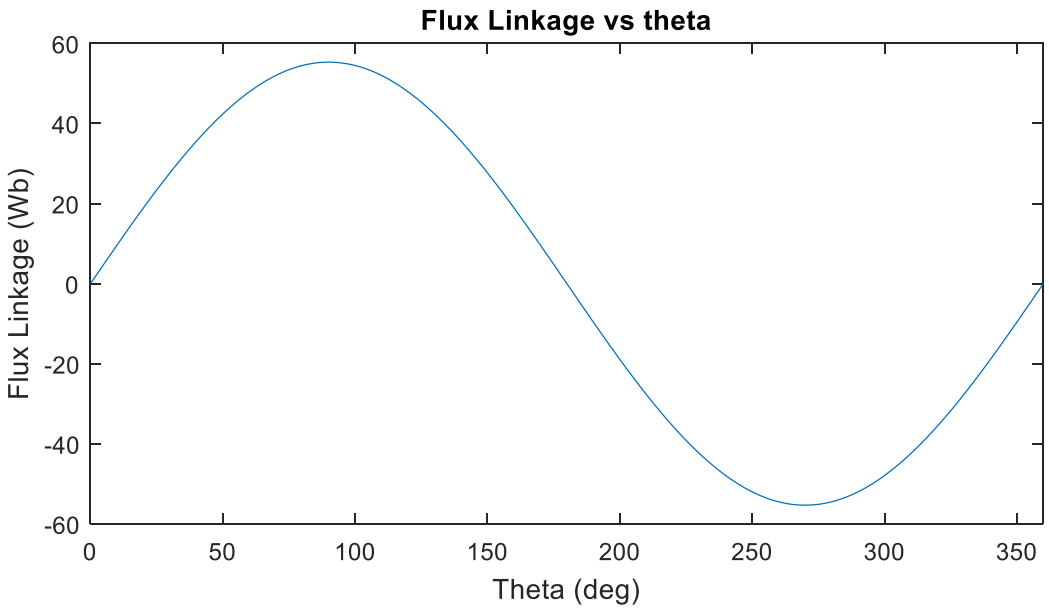


X-axis of the graph is length of the airgap's line. As it is seen from the figure, minimum points are not zero and second half of the plot is also positive. This is not the expected result. Its reason is drawing air gap's flux density directly -without any conversion to radial axis-. To be able to complete this conversion, following link's 22nd and 23rd pages might be useful.

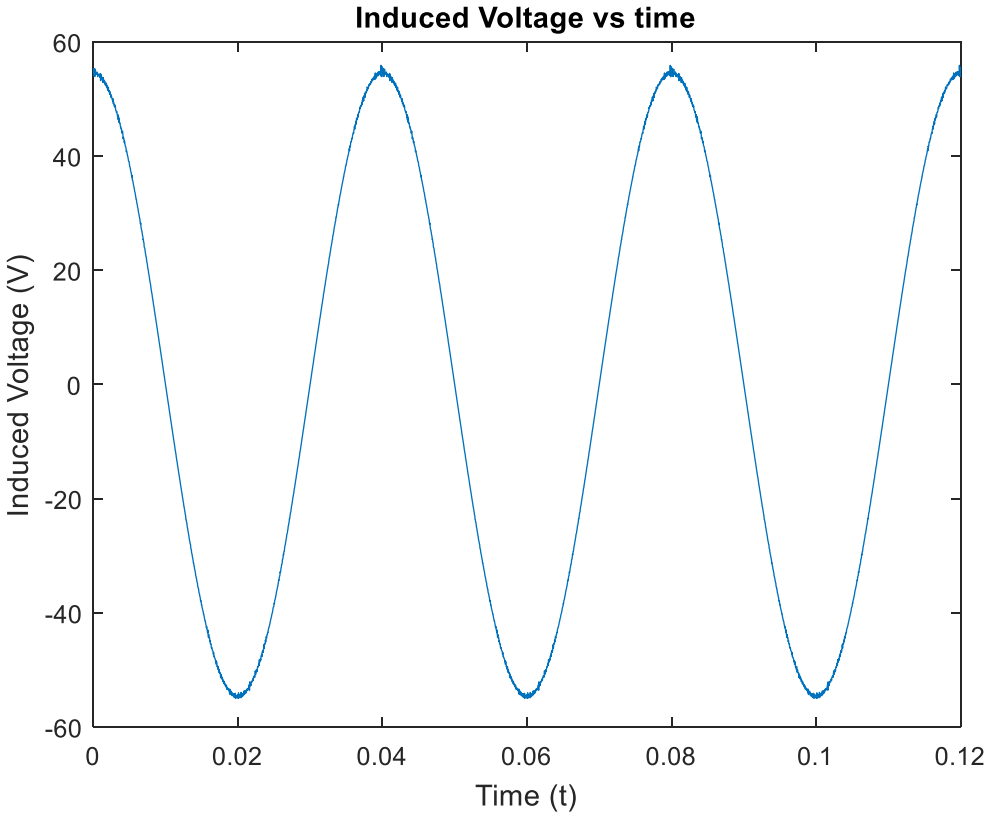
http://register.ansys.com.cn/ansyschina/minisite/201411_em/motordesign/electromagnetism/material/Maxwell_Simplorer_Tips_Tricks.pdf

Once those steps are applied, airgap flux density graph is updated.

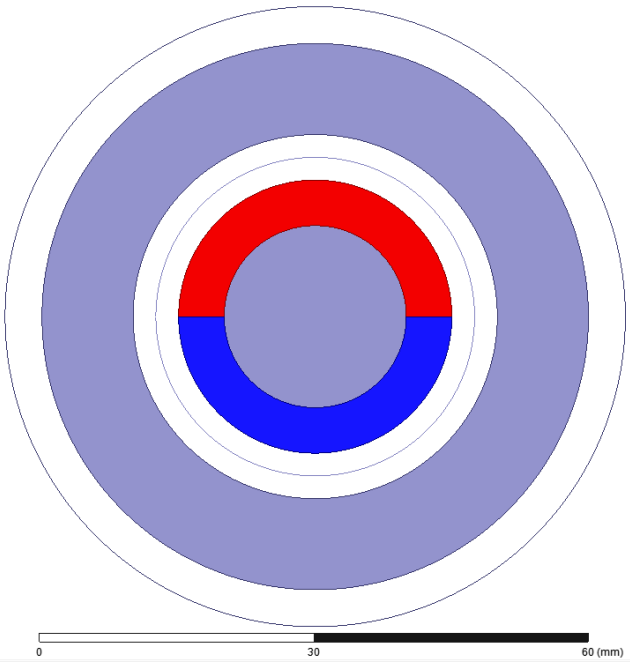




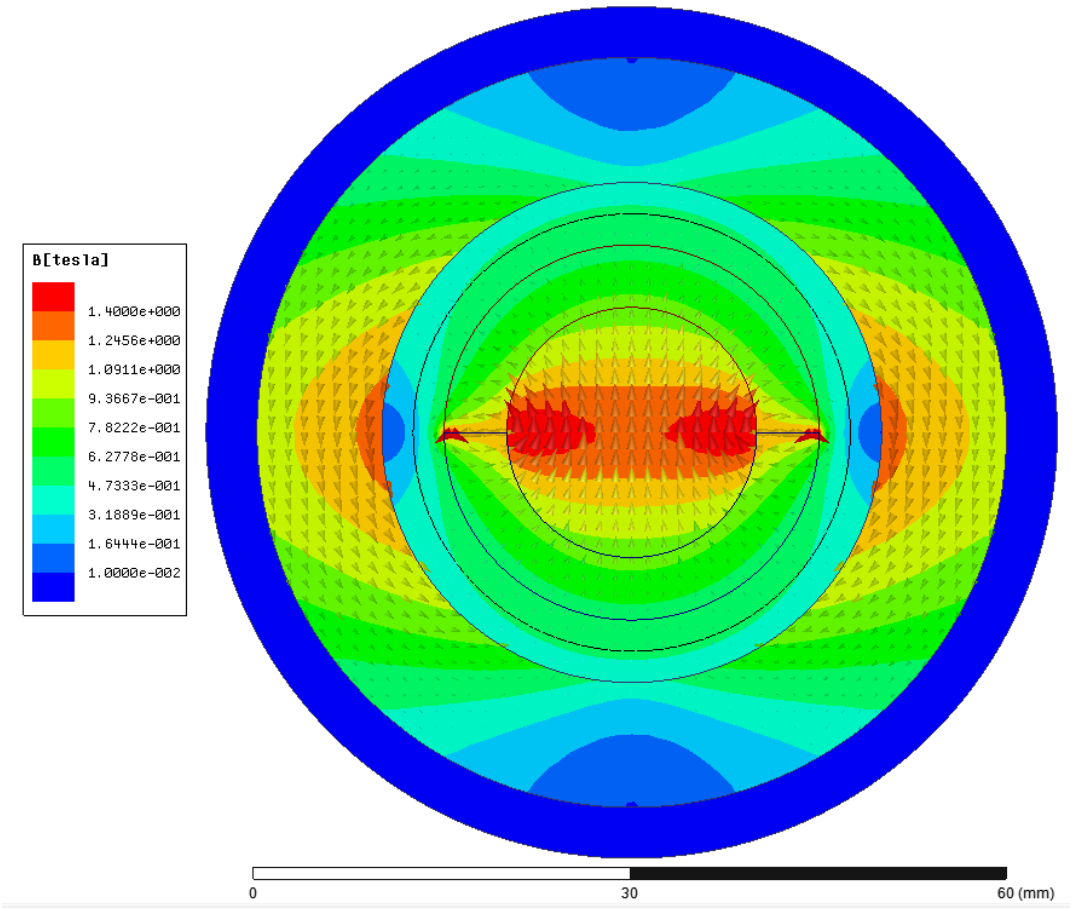
By multiplying airgap flux density with the area, flux linkage above is calculated. Once it is derivated and multiplied with the angular speed of 2π25 rad/s, this voltage is obtained and drawen for 3 periods.

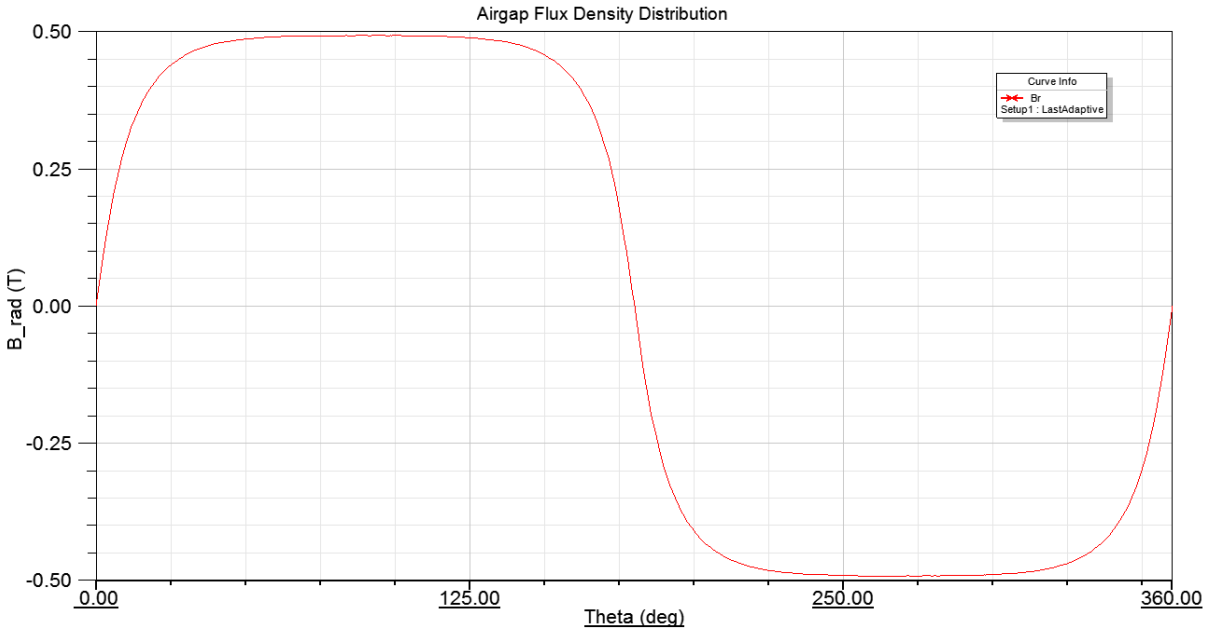


Radially oriented magnet's design notes and corresponding results:

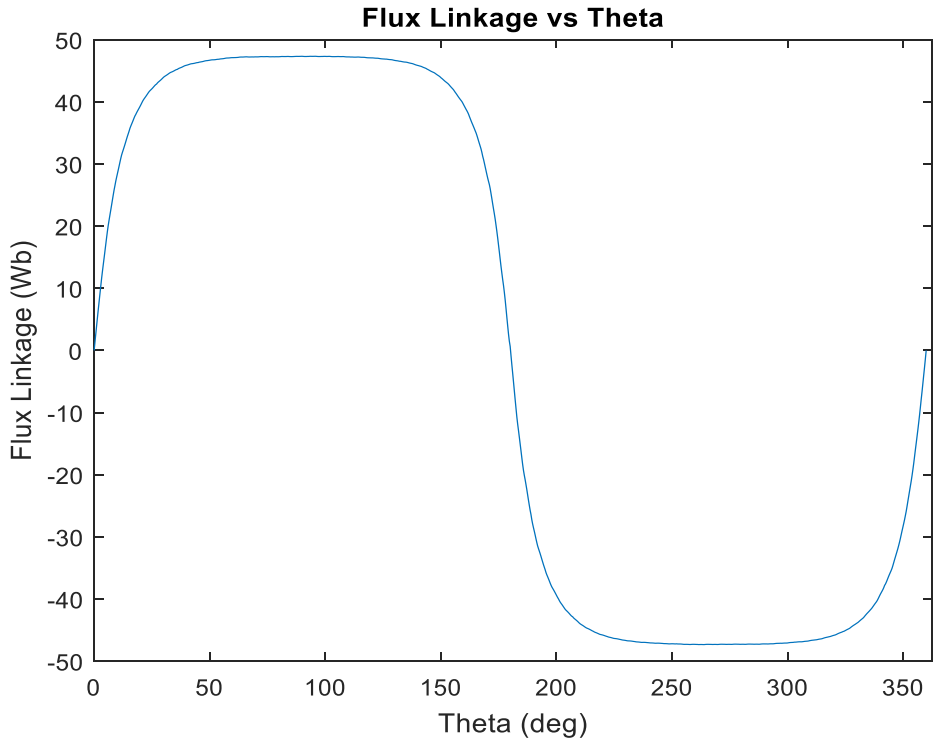


This time two different magnets are defined. For N pole R axis and for S pole –R axis is selected as magnetization orientation.





Same procedure is followed to be able to draw radial flux density distribution over the air gap.



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