EE568 - Selected Topics on Electrical Machines

Project - 3

PM Motor Comparison Analysis

Özgür Yazıcı

03.05.2020

# Introduction

fhgjgj

# Magnetic Loading

## Magnet operating point

Magnetic equivalent circuit for single pole pair is shown in figure 1.



Figure 1 Magnetic equivalent circuit for single pole pair

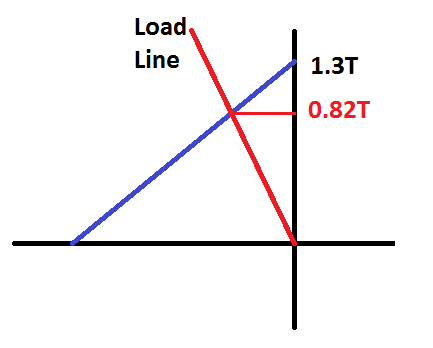


Figure 2 Load line and operating point of magnet

## Magnetic Loading

Magnetic loading means average air gap flux density. It was found in the first part as **0.82T**. This is high for a standard machine. Normally magnetic loading is around 0.6T. This is caused because of assuming the stator solid and taking the gap only 1mm. In reality effective value of air gap length is larger than this value. So magnetic loading should be smaller with a slotted stator.

## Air Gap flux Density Distribution

In this part magnetic circuit is modelled with FEA tool. Model is shown in figure 3. After that, air gap flux density distribution is calculated and plotted in figure 4.

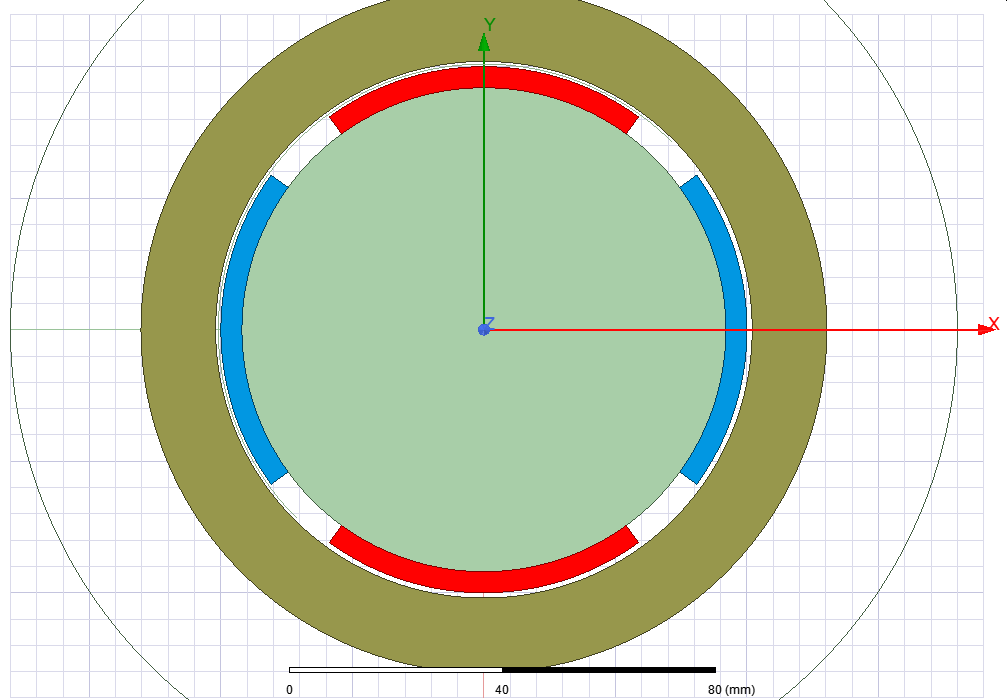


Figure 3 FEA Model

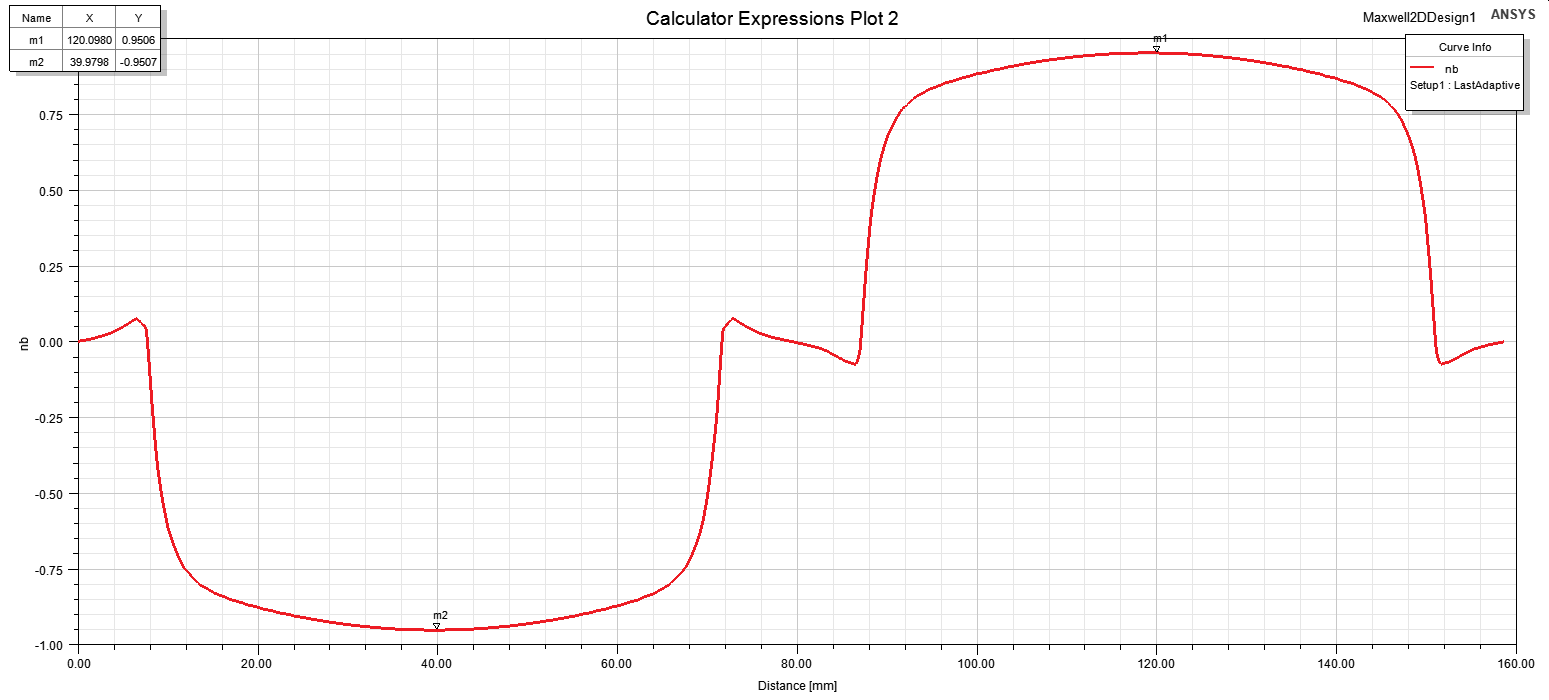


Figure 4 Air gap flux densith distribution

|  |  |  |
| --- | --- | --- |
|  | Avg Flux Density | Peak Flux Density |
| Analytical Result | 0.82 T | 1.29 T |
| FEA Result | 0.68 T | 0.95 T |

# Conclusion

asdasd