ANSYS AIM Eddy Current / Magnetic Frequency Response - Pre-Analysis & Start-Up

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Problem Specification
1. Pre-Analysis & Start-Up
2. Geometry
3. Physics Setup
4. Numerical Solution/Results

Pre-Analysis & Start-Up

Governing Equations

Magnetic frequency response is the study of magnetic fields in devices where the magnetic field is a steady-state, sinusoidal magnetic field at a given frequency. Magnetic frequency response is a special case of Maxwell's equations, which form the basis of electromagnetism. A magnetic frequency response solution includes the calculation of Eddy currents, which are loops of electric current within conductive materials induced by a changing magnetic field.

For sinusoidally varying magnetic fields, the induced Eddy currents will not completely penetrate into the interior of a conductive material. This is referred to as the skin effect, and the Eddy current penetration depth for a conductor can be calculated from the following equation

$$\delta = \frac{1}{\sqrt{\pi f \mu \sigma}}$$

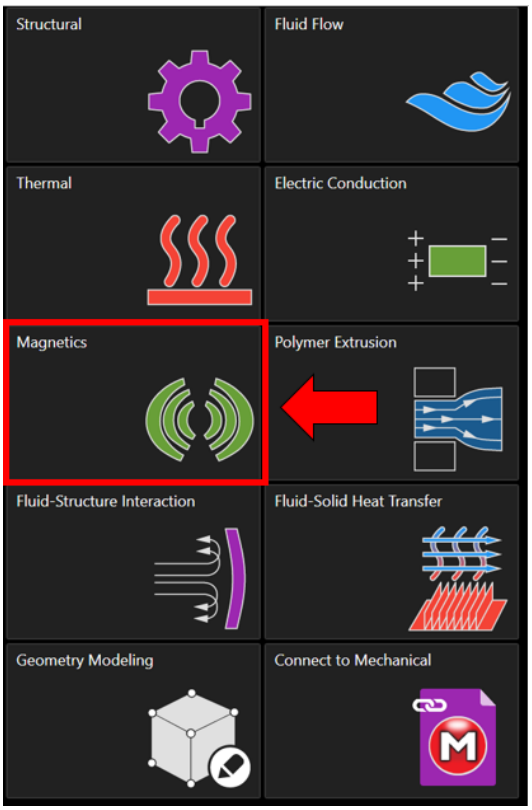
where is the penetration depth, ***f*** is the frequency, is the magnetic permeability of the material, and is the electrical conductivity of the material.

Start-Up

A few words on the formatting on the following instructions:

1. Notes that require you to perform an action are colored in blue
2. General information will be colored in black, but do not require any action
3. Words that are **bolded** are labels for items found in ANSYS AIM
4. Most important notes will be colored in red

Now that the the pre-calculations are finished, we are ready to begin the simulation in ANSYS AIM. Open ANSYS AIM by going to **Start** > **All Apps** > **ANSYS 18.2** > **ANSYS AIM 18.2**. Once starting page has opened, select the **Magnetics** template as shown below.



Go to Step 2: Geometry

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