

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

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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

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

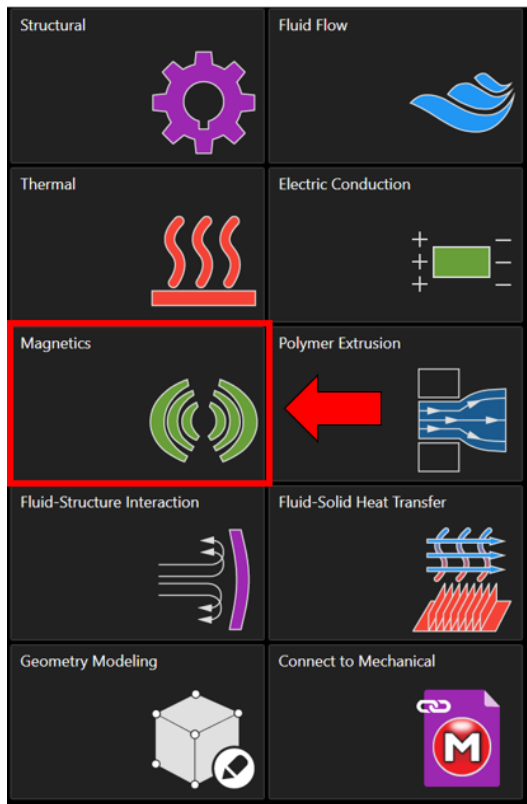
where δ is the penetration depth, f is the frequency, μ is the magnetic permeability of the material, and σ is the electrical conductivity of the material.

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 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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