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ON MIS-ALIGNED CONDUCTORS

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Abstract. In this work, we present an analytical and numerical technique that would solve efficiently a two dimensional problem for the field equations arising from mis-aligned conductors or shell(s). The medium for magnetic field is considered to be constant. The electric current distribution and magnetic field intensity may or may not be uniform depending upon the boundary conditions. Here we shall deal with Dirichlet boundary conditions. A more general case for Neumann boundary conditions could be handled with slight modifications by the assumptions at nearby boundaries of the outer conductor. We compare the numerical solutions to that of the exact solution.
Keywords. numerical methods, edyy currents, fields, forces, skin effect

1 Introduction and Development of the Transformer Winding Model

The usual *Thermodynamic Processes* used to produce electrical power/energy gives a net amount of heat to electrical energy conversion factor probably not more than 40% . This means there is loss of power due to heat. Thus a joule of electrical energy saved in an electrical load can be worth at most three times this energy content in the form of fossil fuels. We are considering the present model to solve differential equations regarding power losses in an electric machine. Under these environments, *Laws of Electromagnetism* are studied, nowadays in universities and in industries research for many applications all over the world. The low frequency phenomena has importance in the study of "Eddy-currents" effects in current carrying conductors which produces a tremendous amount of power loss.
In a traditional power frequency transformer, eddy-current losses create additional heating in the transformer windings as well as flux concentrating core. On the other hand, eddy current engineering is not only related to additional heat losses, rather power frequency devices such as *generator*, *transformers* and *cables/ bus-bars* utilize them. It was J. Clark Maxwell who first of all considered the effect of introducing time varying sinusoidal quantities on the current distribution in long cylindrical wires.

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