

Tutorial 1:

Sunday May 3, 2009 9:00 AM – 12:00 Noon

Motor Design and Optimization using Finite Elements

Speakers:

Mr. Behzad Forghani (Vice President), Infolytica Corporation, Montreal, Canada

Dr. Tanvir Rahman (Applications Specialist), Infolytica Corporation, Montreal, Canada

Admission Fee: Free

Summary

This tutorial will focus on the practical uses of motor design software tools, namely the MotorSolve suite from Infolytica, which are based on electromagnetic field simulation using finite elements. The complex geometry of a motor and the non-linear behaviour of the materials make it necessary to use a field based solution system when accuracy of the motor performance parameters is important. With the ever-increasing power and speed of personal computers, at an affordable price, it is now routine to perform finite-element simulations since solution times have come down significantly. The approach taken in MotorSolve is a graphical user interface which is specific to motor design applications combined with an electromagnetic field analysis engine.

During the tutorial, some background information regarding the sizing, automatic winding layout design and the different types of analyses will be presented and the software features that are required for these calculations will be discussed. The following topics will be covered during the tutorial:

1. Fundamental concepts
2. Template based model data input and sizing
3. Context sensitive input
4. Parameterization of the motor geometry
5. Winding layout
6. Project management
7. Computation of performance parameters
8. System model generation
9. Design optimization

Several motor design examples will be used to illustrate the operation of the motor design and optimization software tools.

Mr. Behzad Forghani received a B. Eng. degree in 1980 and a M. Eng. degree in 1981, both in Electrical Engineering, from McGill University in Montreal, Canada. Since 1981, he has been working at Infolytica Corporation in the field of Computational Electromagnetics and is currently a Vice President. He has been an IEEE member since January 1980 and is a member of

OIQ (Order of Engineers in Quebec). He regularly serves on the Editorial Boards of Compumag and CEFC (two conferences with focus on the electromagnetic field computation) and is a Board Member of the International Compumag Society. His areas of interest are numerical techniques, material modeling, applications/devices and coupled problems.

Dr. Tanvir Rahman has been an application engineer at Infolytica Corporation since 2006. His primary duties and interests include FEA based design and applications of electrical machines, multi-physics simulations etc. He obtained his B. Eng. in mechanical engineering, M Sc. in particle physics and Ph. D. in computational physics from McGill University.