

# CEMETU

Computational Electromagnetics  
Middle East Technical University

A SPECIAL DENSE COURSE / LECTURE SERIES

## INTRODUCTION TO THE MULTILEVEL FAST MULTIPOLE ALGORITHM

OZGUR ERGUL

5-15 May 2014

### LECTURES

- 5 May 2014 13:30-17:00 (3.5 hours) COURSE 1
- 7 May 2014 12:30-14:30 (2 hours) COURSE 2
- 8 May 2014 13:30-17:00 (3.5 hours) COURSE 3
- 9 May 2014 15:30-17:30 (2 hours) COURSE 4
- 10 May 2014 14:00-17:00 (3 hours) COURSE 5
- 12 May 2014 13:30-17:00 (3.5 hours) COURSE 6
- 14 May 2014 12:30-14:30 (2 hours) COURSE 7
- 15 May 2014 13:30-16:00 (2.5 hours) COURSE 8

### TENTATIVE MATERIAL

- COURSE 1: Integral Equations, Surface Integral Equations, Volume Integral Equations
- COURSE 2: Discretization and Method of Moments
- COURSE 3: Details of Method of Moments, Numerical/Analytical Integration, Excitation
- COURSE 4: Basics of FMM and MLFMA, Addition Theorem, Diagonalization, Expansion
- COURSE 5: Details of FMM and MLFMA, Aggregation, Translation, Disaggregation, Sampling
- COURSE 6: Details of FMM and MLFMA, Interpolation and Anterpolation
- COURSE 7: Complexity Analysis, Accuracy Analysis
- COURSE 8: Implementation Details, Interpolation of Translations, Tree Structures

### COURSE REFERENCES

- Lecture Notes
- O. Ergul and L. Gurel, The Multilevel Fast Multipole Algorithm (MLFMA) for Solving Large-Scale Computational Electromagnetics Problems, Wiley, 2014.