ELEC–E4730

Spring 2019

Advanced Field Theory

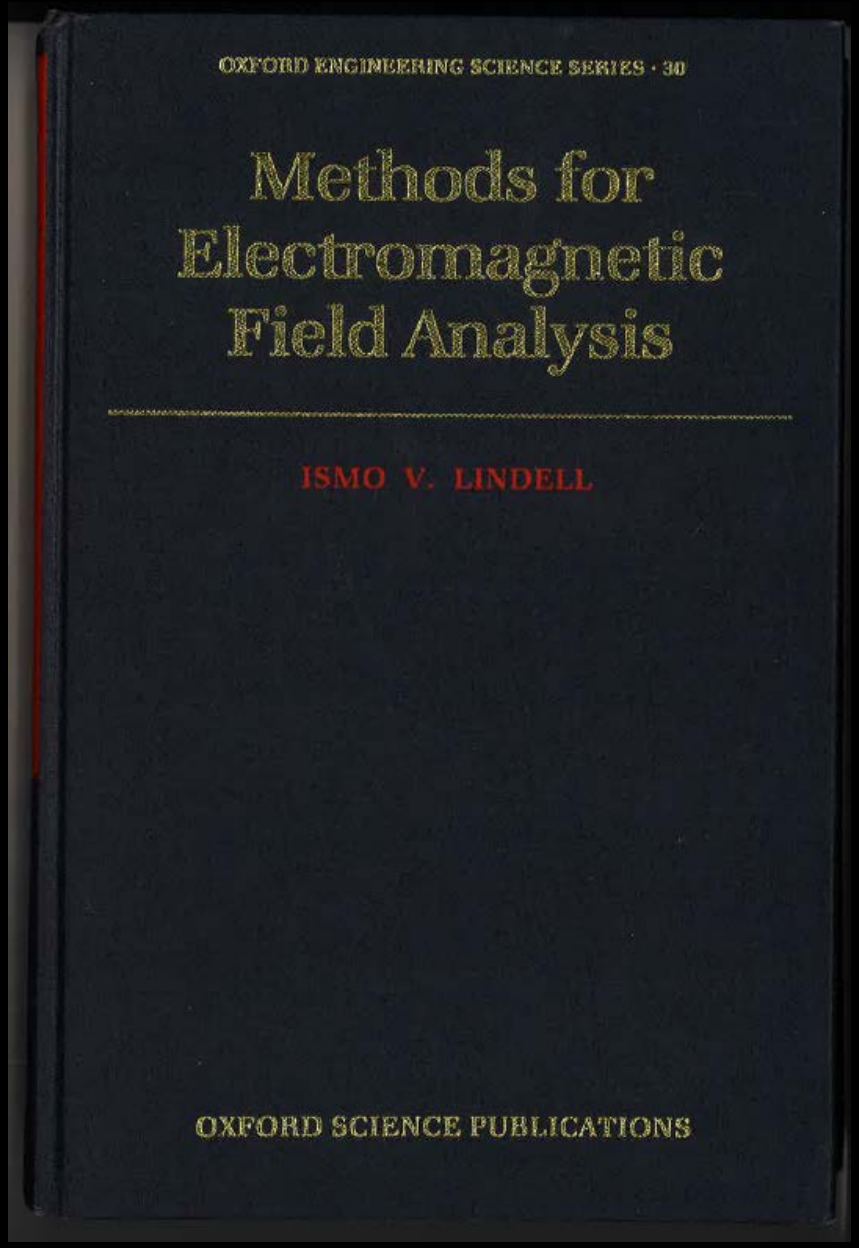
Welcome!

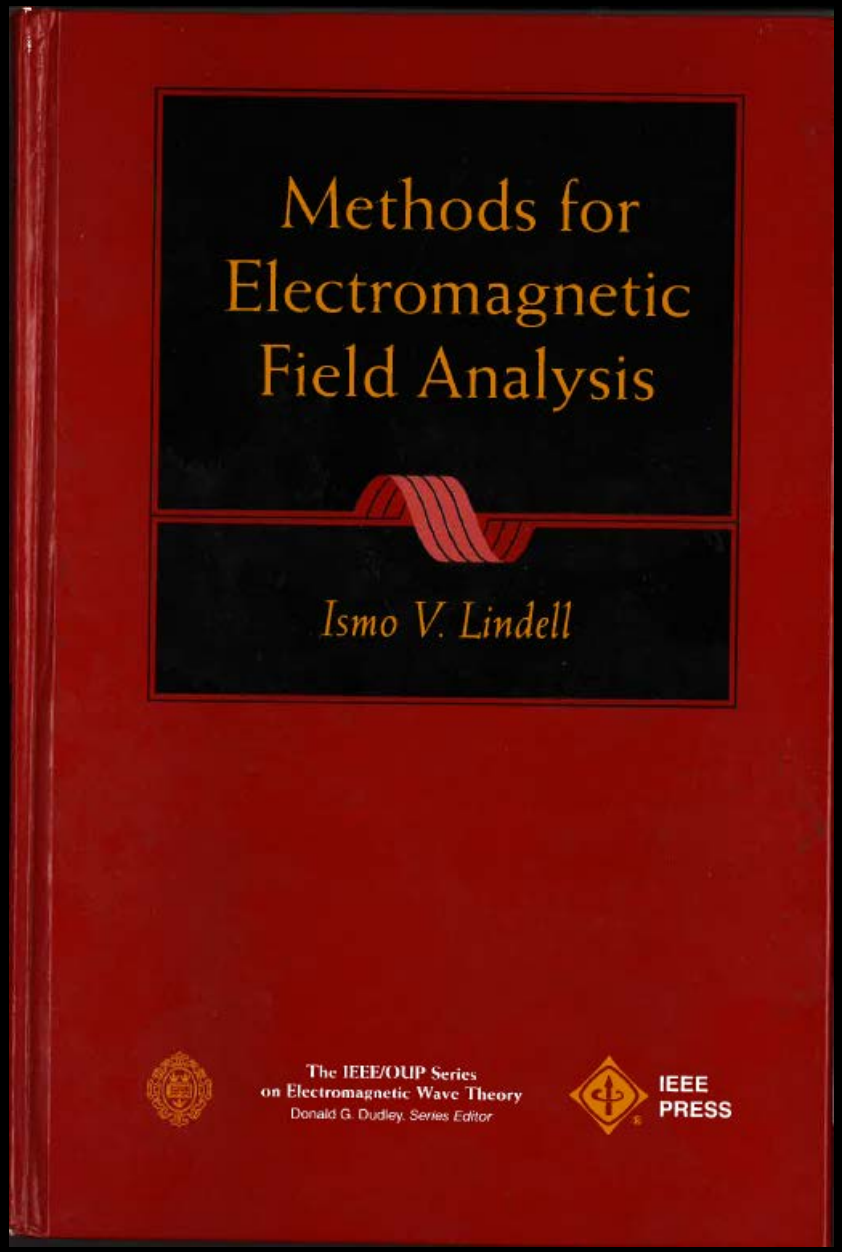
- ***ELEC–E4730***:
  - ***Advanced Field Theory***
- **Spring term 2019: Periods IV + V**
- 5 credit points
- ***Classes:***
  - Mondays LECTURES
    - 12–14 a.m., 1023–1024 (AS4)
  - Thursdays PROBLEM-SOLVING SESSIONS
    - 12–14 a.m., C206 (T3)

Teachers:

- Ari Sihvola
  - lectures

- Dimitrios Tzarouchis
  - problem-solving sessions
- M. Sajjad Mirmoosa
  - problem-solving sessions


OXFORD ENGINEERING SCIENCE SERIES · 30
Methods for Electromagnetic Field Analysis
ISMO V. LINDELL
OXFORD SCIENCE PUBLICATIONS


Methods for Electromagnetic Field Analysis
Ismo V. Lindell
The IEEE/OUP Series on Electromagnetic Wave Theory
Donald G. Dudley, Series Editor
IEEE PRESS

ERRATA Last upgraded July 19, 2004

I.V.Lindell: **Methods for Electromagnetic Field Analysis**, Oxford: Clarendon Press, 1992 and 2nd ed., New York: IEEE Press, 1995.

NOTATION:

p.59, L.4 denotes page 59, line 4 from above

L.7* denotes line 7 from below

(3.169) denotes Equation (3.169)

$x \Rightarrow y$ denotes 'replace x by y'

‡ denotes 'misprint corrected in 1995 edition'

- p.2‡, L.9*: examle ⇒ example
- p.3‡, L.9: $t = \pi/2 \Rightarrow t = \pi/2\omega$
- p.4‡, L.11: $\mathbf{a}_i' + \alpha \mathbf{a}_i'' \Rightarrow \mathbf{a}_i' + j\mathbf{a}_i''$
- p.9‡, (1.33): $\Re \Rightarrow \Im$
- p.10‡, L.26: delete '$\mathbf{u} \cdot \mathbf{u} = 1$ and'
- p.13‡, Fig.1.4: $\mathbf{u}_1 \Rightarrow \mathbf{u}_+$, $\mathbf{u}_2 \Rightarrow \mathbf{u}_-$
- p.88‡, L.6*: CRESS ⇒ KRESS
- p.91‡, below (3.216): trace and determinant are negative numbers ⇒ eigenvalues must be negative numbers
- p.92, (3.222): $(\overline{\overline{Z}}_s^* + \overline{\overline{Z}}_s) \Rightarrow \mathbf{n} \times (\overline{\overline{Z}}_s^* + \overline{\overline{Z}}_s) \times \mathbf{n}$
- p.93, (3.223): replace by $\overline{\overline{Z}}_s^T = -\overline{\overline{Z}}_s^*$
- p.94‡, L.7*: $Z_2 \Rightarrow Z_b$
- p.94‡, L.6: properety ⇒ property
- p.95‡, L.5*: *Physics* ⇒ *Physical*
- p.98‡, L.12: $\overline{\overline{M}} \Rightarrow \overline{\overline{\mu}}$
- p.103‡, L.8: permittivity ⇒ permeability
- p.111‡, (4.59): $D(A+D) = 0 \Rightarrow B(A+D) = 0$ below, $C = D = 0 \Rightarrow C = B = 0$
- p.111, (4.62): $\mu_s \epsilon_s \Rightarrow \sqrt{\mu_s \epsilon_s}$
- p.111, (4.63): the matrix should be transposed
- p.113, (4.72): $\overline{\overline{A}}^{-1T} \Rightarrow \overline{\overline{A}}^{-1T}$ $\overline{\overline{A}}^{T} \Rightarrow \overline{\overline{A}}^{T}$

Course requirements

- Efforts expected:
  - Lectures and problem-solving sessions
  - Homework problems during the course
  - Pre-lecture assignments
  - Independent work
  - Exam **(23th May 2019, 12 a.m.)**
- Evaluation criteria
  - Homework progress 50%
  - Exam success 30%
  - Pre-lecture assignments 15 %
  - Contact-teaching activity 5 %

Schedule

- **Weeks 9–14** Period IV
  - 25 February – 4 April
- **Week 15** (Free of contact teaching)
- **Weeks 16–21** Period V
  - 15 April – 23 May
- **Exam:** 23 May 2019

Assignments/homework solutions return to MyCourses

- Pre-lecture assignments
  - Handed out around mid-week
  - To be returned next week by Monday morning
- Homeworks
  - Handed out Thursday afternoons
  - To be returned next week Wednesday by 8 p.m.

Our textbook:

Methods for Electromagnetic Field Analysis

- Complex vectors
- Dyadics
- Field equations
- Field transformations
- Electromagnetic field solutions
- Source equivalence
- Exact Image Theory

Methods for Electromagnetic Field Analysis

A volume in the IEEE Series on Electromagnetic Wave Theory

Donald G. Dudley, *Series Editor*

'... a gigantic platter of formulae of the dyadic kind'—Akhlesh Lakhtaki, *Professor, The Pennsylvania State University*