

# MEDT8007

Simulation Methods in Ultrasound Imaging

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## Lecture notes

### Week 11 (15-19 March 2010)

Calculation methods for linear fields

Exercise 1:

- [exercises\\_1.pdf](#)
- [exercise\\_1.m](#)
- [ifftmmv.m](#)
- [sirmmv.m](#)
- [exercise\\_1\\_review.m](#)

Pulse-echo and beamforming

Exercise 2:

- [exercise\\_2.pdf](#)
- [exercise\\_2\\_01\\_solution.m](#)
- [exercise\\_2\\_02\\_solution.m](#)
- [exercise\\_2\\_03\\_solution.m](#)
- [exercise\\_2\\_04\\_solution.m](#)
- [exercise\\_2\\_05\\_solution.m](#)
- [exercise\\_2\\_06\\_solution.m](#)
- [exercise\\_2\\_07\\_solution.m](#)
- [exercise\\_2\\_08\\_solution.m](#)
- [exercise\\_2\\_09\\_solution.m](#)
- [exercise\\_2\\_10\\_solution.m](#)
- [exercise\\_2\\_11\\_solution.m](#)
- [show\\_xdc\\_geir.m](#)
- [saveallfigs.m](#)

Scattering and image formation

Slides:

- [Scattering.pdf](#)
- [Image formation.pdf](#)

Exercise 3:

- [exercise\\_3.pdf](#)
- [CIRS\\_phantom\\_model\\_40.pdf](#)
- [exercise\\_3\\_starting\\_point.m](#)
- [plot2dFFT.m](#)

- [ph\\_rect\\_gauss.m](#)
- [exercise\\_3\\_solution.m](#)

#### Transducer design

Slides:

- [Transducer design I.pdf](#)
- [Transducer design II.pdf](#)

Exercise 4:

- [exercise\\_4.pdf](#)
- [xTrans\\_v4.zip](#)
- [plot\\_Vrx.m](#)
- [exercise\\_4\\_solution.pdf](#)

#### Dynamic objects

Slides:

- [Dynamic objects.pdf](#)

Exercise (embedded):

- [simGaussian.m](#)

## Week 18 (3-8 May 2010)

#### Assignments:

Slides:

- [assignment 1 - The DREAM toolbox.pdf](#) (recommended material)
- [assignment 3 - Angular Spectrum Method.pdf](#) (recommended material)
- [assignment 4 - Color flow imaging.pdf](#) (recommended material)
- [assignment 5 - Array beam profile vs. element effective size.pdf](#) (recommended material)
- [assignment 6 - Bubblesim.pdf](#) (recommended material)

#### Alternative linear methods I and II

Slides:

- [FUSK.pdf](#)
- [COLE.pdf](#)

Exercise 5:

- [exercise\\_5.pdf](#)
- [exercise\\_5\\_solution.m](#)

#### Advanced beamforming

Slides:

- [Adaptive beamforming I.pdf](#)
- [Adaptive beamforming II.pdf](#)

Exercise 6:

- [exercise\\_6.pdf](#)

#### Wave equations for lossy media

Slides:

- [Wave equations for lossy media I.pdf](#)

- [Wave equations for lossy media II.pdf](#) (recommended material)
- [Wave equations for lossy media III.pdf](#) (recommended material)

Non-linear propagation I and II

Slides:

- [Propose.pdf](#)

Exercise 7:

- [exercise 7.pdf](#)
- [exercise 7.zip](#)
- [Lee, Y.S., et al., \*Time-domain modeling of pulsed finite-amplitude sound beams\*, J Acoust Soc Am, vol. 97, no. 2, 1995.](#)
- [exercise 7 solution.zip](#)
- [measurement results.pdf](#)

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