TKK Tietoliikennelaboratorio
HUT Communications Laboratory

Laboratory work 1
FREQUENCY ANALYSIS OF SIGNALS USING MATLAB
What to do?
In this laboratory work we get familiar with using Matlab for analysing signals. We examine continuous time signals in both time and frequency domain. Frequency transformations to signals are made with FFT (Fast Fourier Transform). Examined signals are sum signal of cosine waves, square and sawtooth wave, sample signals and samples of own voice.

How to do?
Examined signals are generated using Matlab commands, for example x = cos(2*pi*f*t). Sample vectors generated for example in Excel are imported to Matlab. Also sound files that are generated during the work are imported. All signals can be listened through the sound card of the PC. Work consists of four parts (A, B, C and D). Completion of the work doesn't require earlier knowledge of using Matlab.

What to take with?
During the work you will need course book or hand-outs of the course and tools to make notes and calculations. Course book / hand-outs you will need for solving the questions.

Documentation during the work
Graphs and program listings are printed for each group according to given instructions. Some or all of the results may be sent by e-mail to group members. Observations from listened sound files should be written down. Assistant gives parameters to some assignments. This laboratory work can be made with any of the computers reserved for the work (12).

Reporting
Before the laboratory work each group answers to the preliminary questions and returns the answers to the assistant in the beginning of the work. You can't begin without returned answers. After the laboratory work each group writes a report, which will be returned to a box under the noticeboard of the course.

Grading of the work
The maximum points for the preliminary questions is 35 and for the report 65. Therefore, the overall maximum for the laboratory work is 100 points as for every work.

How to pass the work
Both the preliminary questions and the report must be returned. The required minimum for the preliminary questions is 15 points and 25 points for the report. If this is not the case, one has to retake the work (or just the preliminary questions or the report).

Hardware
800 MHz Pentium III PC including:
- 256 MB RAM
- 16 bit SB sound card and 19" monitor
- NI DAQ oscilloscope card (20 MHz, 20MS/s) and test leads (2 pcs.)
- Windows NT 4.0 operating system
- Matlab 6.0 software
- Virtual Bench measuring software
- Goldwave (or corresponding) sound processing program
- E-mail and Internet browser programs
- Active loudspeakers and microphone
- Test board with components needed
- Network printer