Integral Equations in Visual Computing
Summer term 2008
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Assignment H2

Deadline for submission:
Thursday , May 15th, 10:00, at the beginning of the lecture

Problem 1: (4 points)
Calculate the general solution of the following system:

$$\begin{cases} y_1' &= -y_2, \\ y_2' &= y_1 + x, \end{cases}$$

using matrix and vector notation.

Problem 2: (2 points)
Calculate the following Laplace transforms:

a) $\mathcal{L}[1]$
b) $\mathcal{L}[e^{at}]$

Specify in each case the domain of definition of the transformed function.

Problem 3: (4 points)
Prove the following equalities:

a) $\mathcal{L}[\frac{f(t)}{t}](s) = \int_s^{+\infty} \mathcal{L}[f](\tau)\,\mathrm{d}\tau, \quad s > 0$
b) $\mathcal{L}[\sin t](s) = \frac{1}{s^2+1}, \quad s > 0$