



MATEMATIK F2

Ørsted Laboratoriet
Niels Bohr Institutet fAFG
Universitetsparken 5
2100 København

Kontor	DS06
Telefon	35 32 04 23
Telefax	35 32 04 60
Email	jens@fys.ku.dk

Ugeseddel 7

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Tekst til opgaver i afsnit 6.3 i 7. ed. (5.1 i 8. ed.):

Opgave 3: Find $\mathcal{L}\{e^t \sin t\}$.

Opgave 15: Find $\mathcal{L}^{-1}\{s/[(s+3)^2+1]\}$.

Opgave 25: Represent the following function in terms of unit step functions and find the Laplace transform:

$$f(t) = \begin{cases} 1, & \text{if } 0 < t < 1, \ 2 < t < 3, \ 4 < t < 5, \text{ etc.} \\ 0, & \text{if } 1 < t < 2, \ 3 < t < 4, \ 5 < t < 6, \text{ etc.} \end{cases}$$

Opgave 28: Sketch the following function and find its Laplace transform:
 $f(t) = t u(t-1)$.

Opgave 44: Find and sketch $\mathcal{L}^{-1}\{e^{-\pi s}/(s^2+2s+2)\}$.

Opgave 65: Using Laplace transforms, solve: $y'' + y' - 2y = r(t)$

$$r(t) = \begin{cases} 3 \sin t - \cos t, & \text{if } 0 < t < 2\pi \\ 3 \sin 2t - \cos 2t, & \text{if } 2\pi < t \end{cases}$$

and $y(0) = 1, y'(0) = 0$.

Opgave 67: LR -circuit (figure 120, p.274, with a switch inserted between R and L): Find the current $i(t)$ in the LR -circuit, assuming that no current flows when $t \leq 0$ and the switch is closed at $t = 0$ ($v(t) = V_0$ when $t > 0$).

Opgave 68: Den samme som opgave 34 i afsnit 5.3 i 8. ed.

Opgave 14 i afsnit 6.4: Solve:

$$y'' + 2y' - 3y = \delta(t-2) + \delta(t-3), \quad y(0) = 1, y'(0) = 0.$$