



SIF5010 Matematikk 3 14.8.00

Fasit

Oppg 1 $y = x^3 \ln x, x > 0$

Oppg 2

- a) $y = c_1 \cos x + c_2 \sin x + x$ for $a = 1$
 $y = c_1 e^x + c_2 e^{-x} - x$ for $a = -1$
- b) $y = c_1 e^{-x} + c_2 x e^{-x} + \frac{e^{bx}}{(b+1)^2}$ for $b \neq -1$
 $y = c_1 e^{-x} + c_2 x e^{-x} + \frac{1}{2} x^2 e^{-x}$ for $b = -1$
- c) $y = c_1 e^{-x} + c_2 x e^{-x} + \frac{4}{15} x^{5/2} e^{-x}$

Oppg 3

- a) $\alpha \neq 7 : \dim \text{Col}(A) = 3, \dim \text{Null}(A) = 2$
 $\alpha = 7 : \dim \text{Col}(A) = 2, \dim \text{Null}(A) = 3$
- b) Løsbart for $\beta = 1, \alpha \neq 7$
 $[x_1, x_2, x_3, x_4, x_5]^T = [2t - s + 5, t, s - 1, s, -1]^T$

Oppg 4

- a) $\mathbf{u}_1 = [1 \ 1 \ 1 \ 1 \ 0]^T, \mathbf{u}_2 = [1 \ -1 \ -1 \ 1 \ 1]^T, \mathbf{u}_3 = [1 \ -1 \ 1 \ -1 \ 0]^T$ (f.eks.)
 $\text{proj}_V \mathbf{b} = [1 \ 2 \ 3 \ 0 \ -1]^T$
- b) $[1 \ 1 \ -1 \ -1 \ 0]^T, [-1 \ 0 \ 1 \ 0 \ 2]^T$ (f.eks.)

Oppg 5

- a) 5, 7 med tilhørende vektorer $[0 \ 4 \ -1 \ 3]^T, [0 \ 1 \ 0 \ 1]^T$ (f.eks.)
- b) $\det A \neq 0$; egenvektorer som før, egenverdier 1, 1/3, 1/5, 1/7

Oppg 6 $\frac{5}{4} < a < 2$