

MAT 91122 Opgave E8

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Funktionen f er givet ved

$$f(x, t) = \frac{1}{\sqrt{t}} e^{-\frac{1}{t}x^2}$$

Vi finder

$$\begin{aligned} f_t(x, t) &= \frac{\partial}{\partial t} f(x, t) = -\frac{1}{2t^{\frac{3}{2}}} e^{-\frac{1}{t}x^2} + \frac{1}{t^{\frac{5}{2}}} x^2 e^{-\frac{1}{t}x^2} \\ f_x(x, t) &= \frac{\partial}{\partial x} f(x, t) = -\frac{2}{t^{\frac{3}{2}}} x e^{-\frac{1}{t}x^2} \\ f_{xx}(x, t) &= \frac{\partial^2}{\partial x^2} f(x, t) = -\frac{2}{t^{\frac{3}{2}}} e^{-\frac{1}{t}x^2} + \frac{4}{t^{\frac{5}{2}}} x^2 e^{-\frac{1}{t}x^2} \end{aligned}$$

Vi ser, at

$$\frac{\partial}{\partial t} f(x, t) = \frac{1}{4} \frac{\partial^2}{\partial x^2} f(x, t)$$

Den søgte konstant er altså $k = \frac{1}{4}$.