

Symbolic mathematics with Maxima  
Some formulas for exercise packages C & X

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## 1 Linear algebra

$$(1) \quad A = \begin{bmatrix} 2 & 0 & 2 \\ 2 & 1 & 1 \\ 2 & 2 & 0 \end{bmatrix}$$

$$(2) \quad M = \begin{bmatrix} 1 & e^{-a^2/2} & 1 \\ 3 & 1 + 2/(a^2 + 1) & 5 - a \\ 2 & 0 & e^{-a^2/3} \end{bmatrix}$$

## 2 More Calculus

$$(3) \quad \frac{\partial f}{\partial x}, \quad \frac{\partial f}{\partial y}, \quad \dots$$

$$(4) \quad \frac{\partial^2 f}{\partial x^2}, \quad \frac{\partial^2 f}{\partial x \partial y}, \quad \frac{\partial^2 f}{\partial y \partial x}, \quad \dots$$

$$(5) \quad f \mapsto \frac{\partial^2 f}{\partial x_1^2} + \frac{\partial^2 f}{\partial x_2^2} + \dots + \frac{\partial^2 f}{\partial x_n^2} \quad (\text{Laplace operator, } \Delta)$$

$$(6) \quad f \mapsto \frac{\partial f}{\partial t} - \Delta f \quad (\text{Heat operator})$$

$$(7) \quad \text{div}(F) = \frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y}.$$