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Institutt for matematiske fag

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Exercise set 10

1 Find the equation for the line that goes through the point $(1, 2)$ and is perpendicular to the vector $(-2, 1)^T$.

2 Find the equation for the plane that goes through the point $(2, 0, -1)$ and is perpendicular to the vector $(1, 1, -2)^T$.

3 Find a parametric equation for the line that goes through the points $(0, 2)$ and $(2, -1)$. Then find the equation for the line on standard form.

4 We have

(1) A plane that passes through the point $(2, 0, -1)$ and has normal vector $(-1, 1, 3)^T$.

(2) A line passing through the points $(1, 0, -2)$ and $(-1, -1, 1)$.

Where does the plane and the line meet?

5 Evaluate the function

$$f(x_1, x_2) = \frac{2x_1 - x_2}{x_1^2 + x_2^2}$$

in the point $(1, 4)$.

6 Find the largest possible domain and corresponding range of the function

$$f(x_1, x_2) = \sqrt{9 - x_1^2 - x_2^2}.$$

Then find the equation for the level curves $f(x_1, x_2) = c$ for the possible values of c.