Formeln S61 S65

The provided text does not contain any specific reference to pages 61-65, and no additional context or content from these pages is given. Therefore, I can only list the mathematical formulas from the text you provided earlier. Here are the formulas along with their associated titles or explanations:

Gradient Properties in 2D

- (a) $\nabla \hat{e} f \in [-|\nabla f|, +|\nabla f|]$
- (b) $\alpha = 0 \Leftrightarrow \hat{e} \parallel +\nabla f \Leftrightarrow \nabla \hat{e} f = +|\nabla f|$ (maximal)
- (c) $\alpha = \pi \Leftrightarrow \hat{e} \parallel -\nabla f \Leftrightarrow \nabla \hat{e} f = -|\nabla f|$ (minimal)
- (d) $\alpha = \frac{\pi}{2} \Leftrightarrow \hat{e} \perp \nabla f \Leftrightarrow \nabla \hat{e} f = 0$
- (e) $\nabla f = 0 \Leftrightarrow$ Tangential plane at the graph of f runs horizontally

Directional Derivative

- $\nabla \hat{e} f = \langle \hat{e}, \nabla f \rangle = |\hat{e}| \cdot |\nabla f| \cdot \cos(\alpha) = 1 \cdot |\nabla f| \cdot \cos(\alpha) = \cos(\alpha) \cdot |\nabla f|$ (Equation 2.199)

Hesse Formula in nD

- $\nabla^2_{\hat{w}\hat{v}} f = \nabla_{\hat{w}}(\nabla_{\hat{v}} f) = \langle \hat{w}, H \cdot \hat{v} \rangle$ (Equation 2.200)
- $\nabla^2_{\hat{v}\hat{v}} f = \langle \hat{v}, H \cdot \hat{v} \rangle$ (Equation 2.201)
- $\nabla^2_{\hat{v}\hat{w}} f = \nabla^2_{\hat{w}\hat{v}} f$ (Equation 2.202)
- $\nabla^2_{\hat{e}_\mu \hat{e}_\nu} f = f_{,\nu,\mu} = H_{\nu\mu}$ (Equation 2.203)

Critical Point

- $\nabla f(P) = 0$ (Equation 2.204)

Local Extrema in 2D

- $\nabla^2_{\hat{e}\hat{e}} f = \langle \hat{e}, H \cdot \hat{e} \rangle = \frac{1}{1+t^2} \cdot g(t)$ (Equation 2.206)
- $g(t) = H_{22} \cdot t^2 \pm 2 \cdot H_{12} \cdot t + H_{11}$ (Equation 2.207)
- $D = -4 \cdot \det(H)$ (Equation 2.208)
- $\det(H) = \lambda_1 \cdot \lambda_2$ (Equation 2.210)

Finding Critical Points

- $\nabla f(x; y) = 0$ (Equation 2.211)

Data Table for Critical Points

- $z_k = f(x_k; y_k)$ (Equation 2.212)
- $H_k = \nabla^2 f(x_k; y_k)$ (Equation 2.213)
- Data table format (Equation 2.214)

These formulas are extracted from the detailed mathematical context provided in your text.