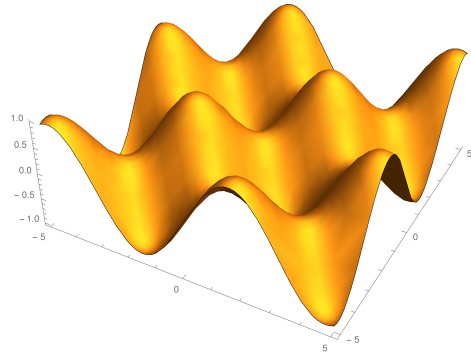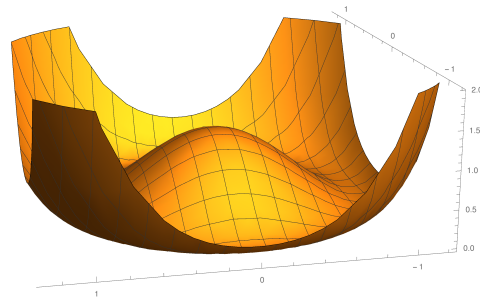# Extrema: Examples

$(D = \mathbb{R}^2)$

$f(x, y) = \sin(x)\sin(y)$

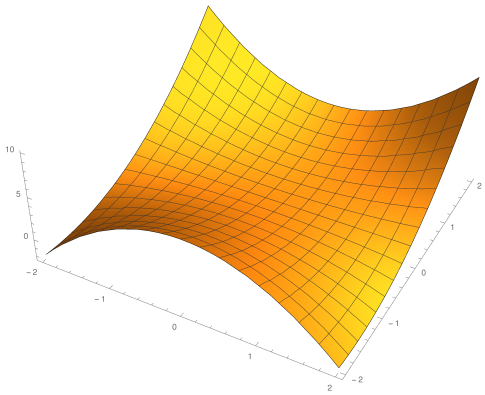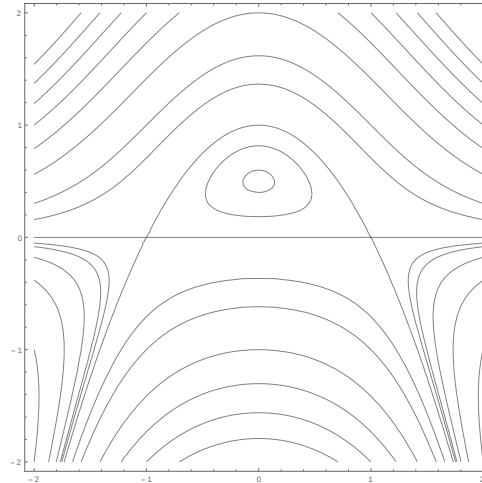$f(x, y) = (1 - x^2 - y^2)^2$

Extrema: Examples
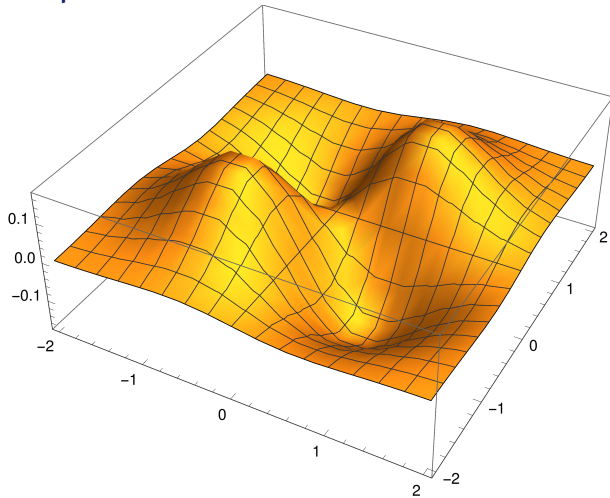
$f(x, y) = x^2 y + y^2 - y$
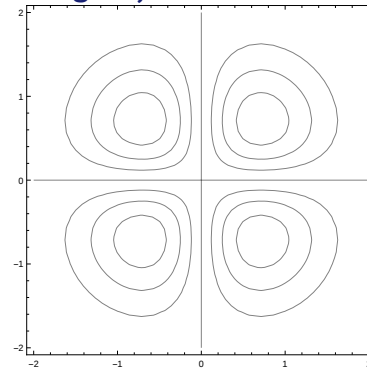
Graph:

Hoogtelijnen:

Extrema: Examples

$f(x, y) = xye^{-x^2 - y^2}$

Graph:

Hoogtelijnen:

Global extrema on bounded domains including the boundary

Theorem: Continuous functions on bounded domains including the boundary take their maximal and minimal value in some point.

Procedure to find them for differentiable functions:

- find critical points in the interior,

Global extrema on bounded domains including the boundary

Theorem: Continuous functions on bounded domains including the boundary take their maximal and minimal value in some point.

Procedure to find them for differentiable functions:

- find critical points in the interior,
- find global extrema on the boundary.

Global extrema on bounded domains including the boundary

Theorem: Continuous functions on bounded domains including the boundary take their maximal and minimal value in some point.

Procedure to find them for differentiable functions:

- find critical points in the interior,
- find global extrema on the boundary.

$\left.\right\}$ "candidates" for global extrema

Global extrema on bounded domains including the boundary

Theorem: Continuous functions on bounded domains including the boundary take their maximal and minimal value in some point.

Procedure to find them for differentiable functions:

- find critical points in the interior,
- find global extrema on the boundary. } "candidates" for global extrema

- Find the largest / smalles value among the candidates.