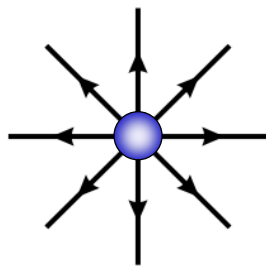
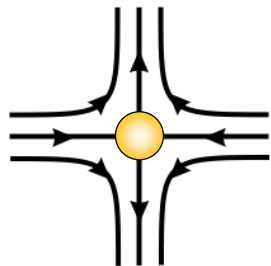


critical points as defined by the gradient

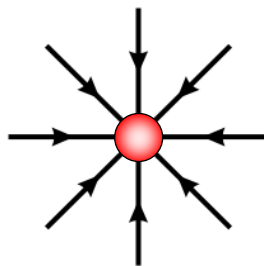
$$\mathbf{v}(\mathbf{x}_0) = \mathbf{0} \quad \text{with} \quad \mathbf{v}(\mathbf{x}_0 \pm \epsilon) \neq \mathbf{0}$$



Repelling node
 $R_1, R_2 > 0$
 $I_1 = I_2 = 0$

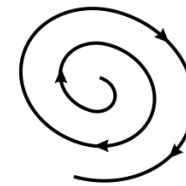


Saddle point
 $R_1 < 0, R_2 > 0$
 $I_1 = I_2 = 0$

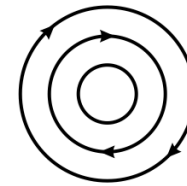


Attracting node
 $R_1, R_2 < 0$
 $I_1 = I_2 = 0$

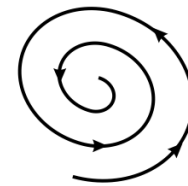
general vector fields



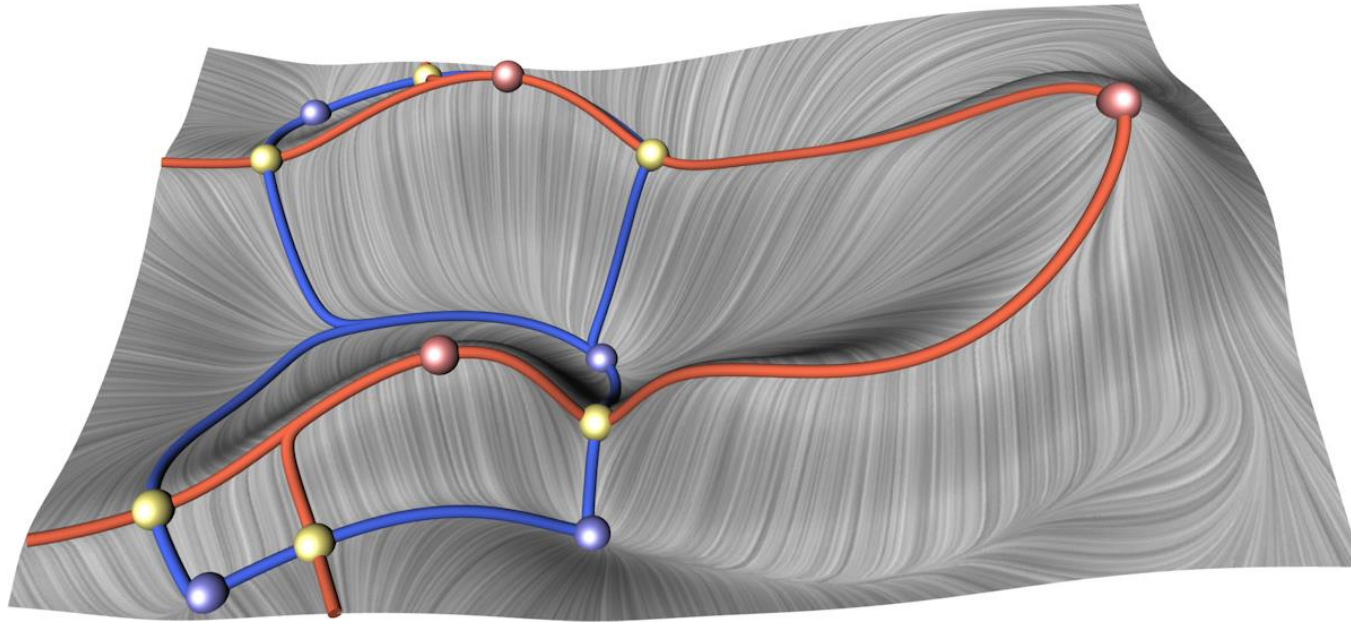
Repelling focus
 $R_1 = R_2 > 0$
 $I_1 = -I_2 \neq 0$



Center
 $R_1 = R_2 = 0$
 $I_1 = -I_2 \neq 0$

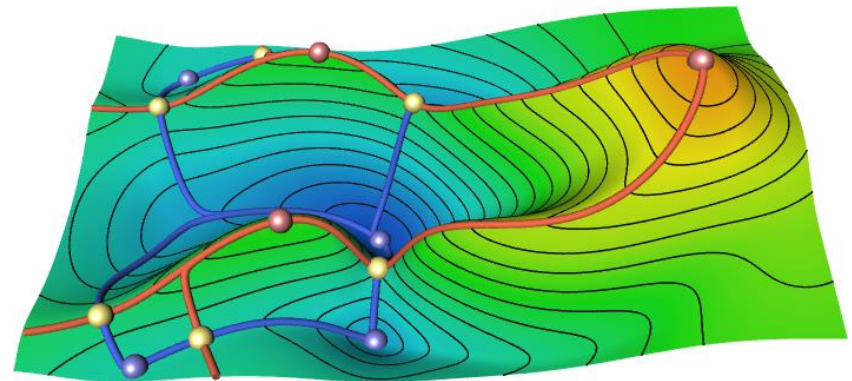


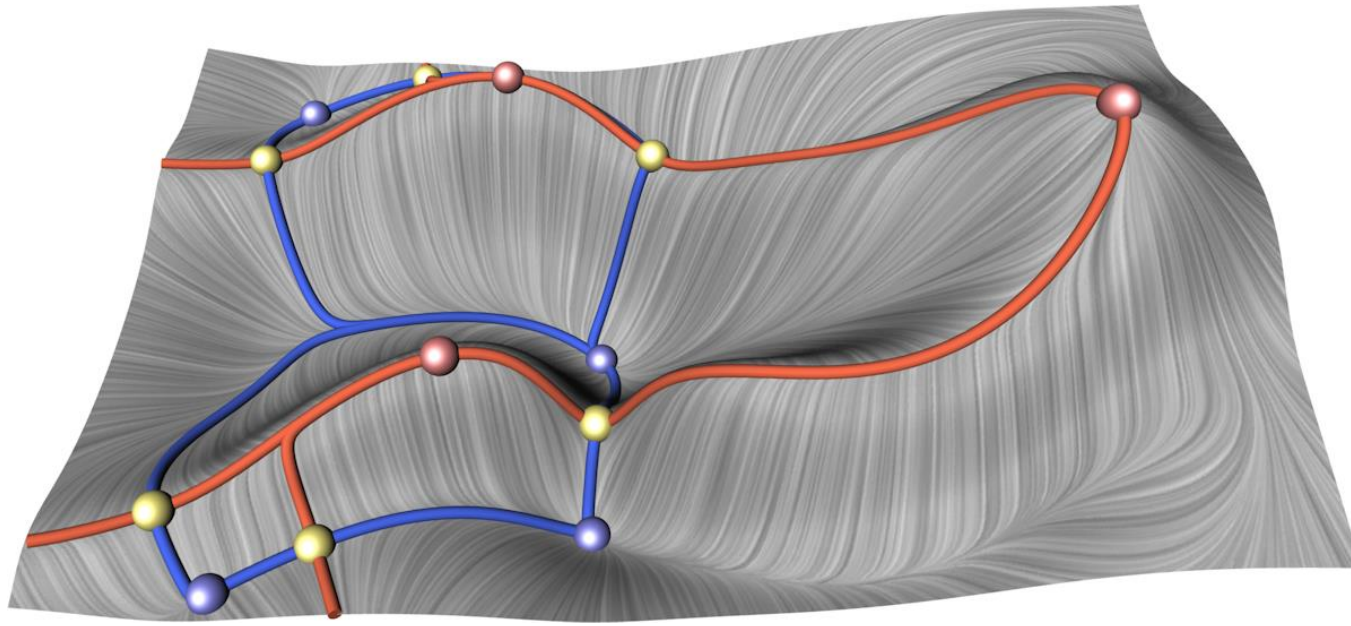
Attracting focus
 $R_1 = R_2 < 0$
 $I_1 = -I_2 \neq 0$



Separatrices

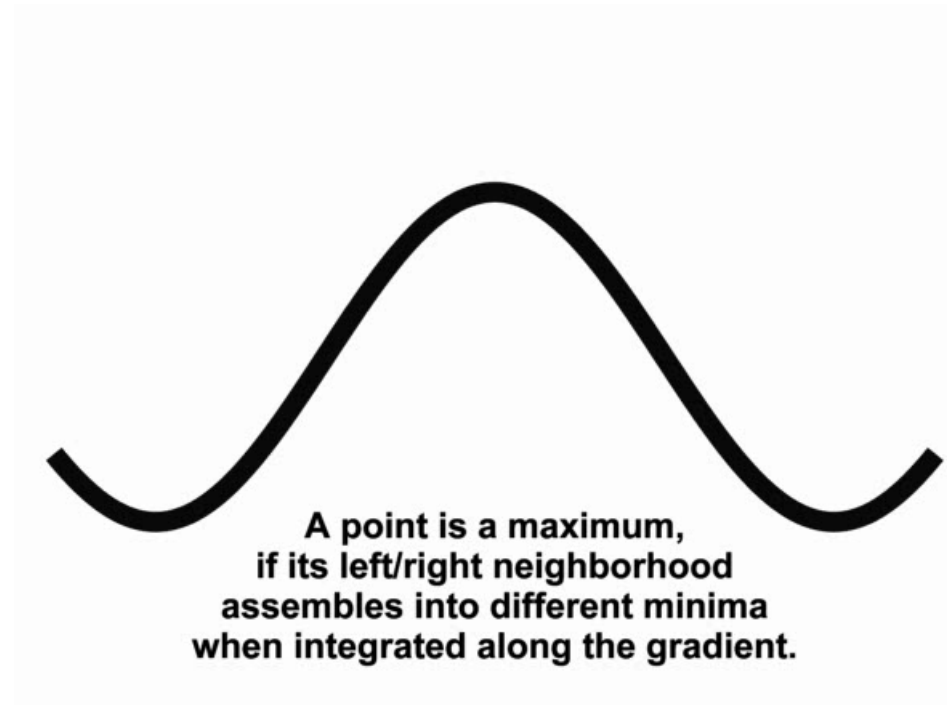
- integral lines of the gradient
- → follow the steepest ascend
- → perpendicular to isocontours





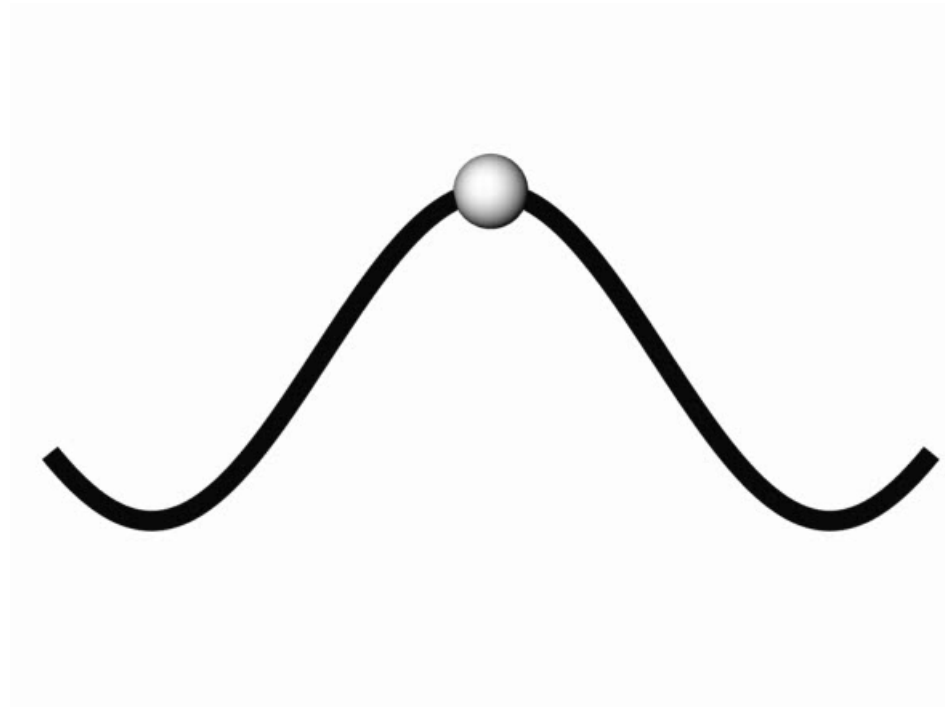
Separatrices

- integral lines of the gradient
- → follow the steepest ascend
- → perpendicular to isocontours
- started at saddle points
- extremal structures



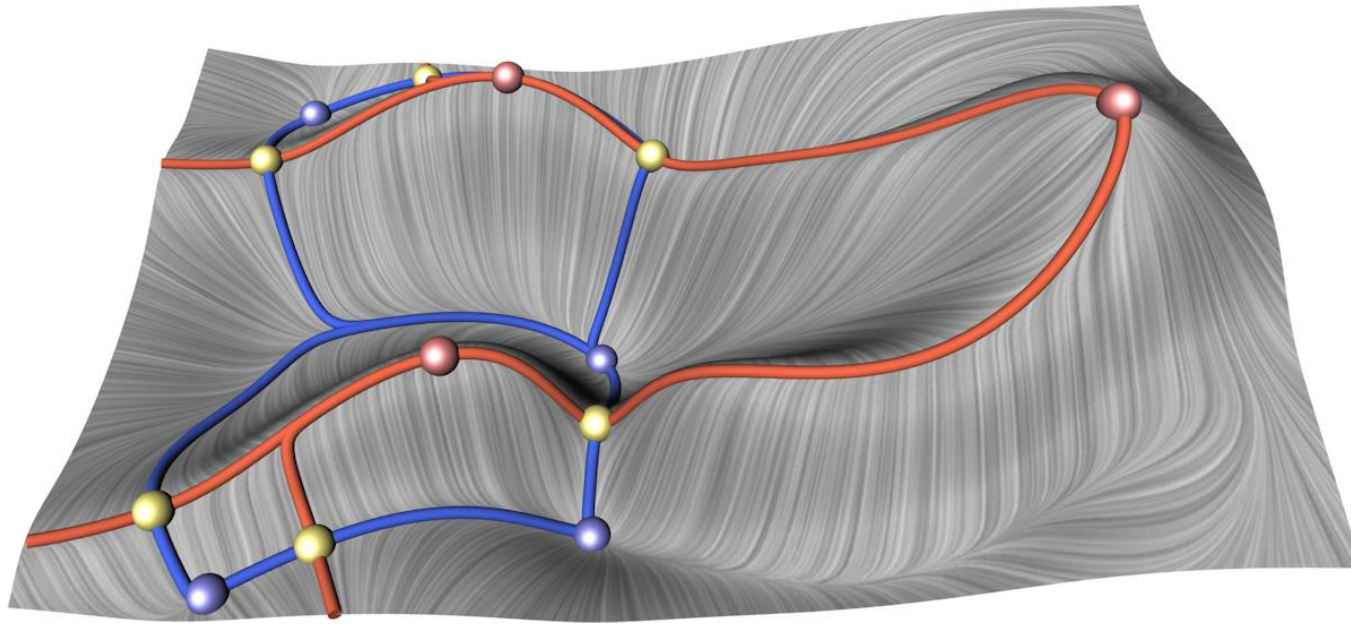
Separatrices

- integral lines of the gradient
- started at saddle points
- → follow the steepest ascend
- **extremal structures**
- → perpendicular to isocontours



Separatrices

- integral lines of the gradient
- → follow the steepest ascend
- → perpendicular to isocontours
- started at saddle points
- **extremal structures**



Separatrices

- integral lines of the gradient
- started at saddle points
- extremal structures
- global structures
we cannot decide locally, whether a point is on a separatrix or not.
- parallel computation limited