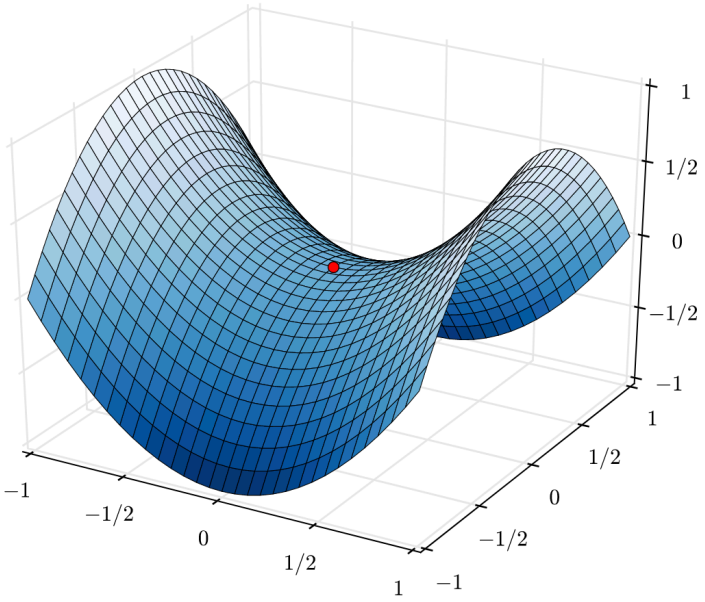
Saddle Point Walk



In Science Museums, people of all ages play with science, experimenting and discovering fascinating features or phenomena. Some exhibits can also be placed outdoors (e.g. in the museum's yard), like the one we describe below.

For a function of two variables, a *saddle point* is, roughly speaking, a point on the graph which looks like the centre of a *horse saddle*. Another visualisation is seeing the saddle point as a *mountain pass*: standing at the saddle point and moving on the graph, one can go upwards (climbing one of the two mountains) or downwards (descending towards one of the two valleys). According to the direction that one takes, there are different slopes, and there are also directions where one walks around the mountains without climbing nor descending.

To better understand a saddle point, one could touch a 3D-printed model. It would also be possible to build a huge saddle point so that one can truly walk on it. Colourful dots could mark the directions with highest *slope*, and also the directions where one neither climbs nor descends. Or one could display *level curves*. Notice that this exhibit can be made children-safe.

In general, in the museum yard, one can display fascinating mathematical objects on a large scale, especially if they would also serve as a playground. For example, one could have a climbing structure in the shape of an interesting polyhedron. Or have the *giant donut,* namely a torus (with six circular holes on the sides) where one can both climb upon or crawl inside, and that can be coloured in a mathematically interesting way (notice that this exhibit can also be used for sitting a group of school pupils). I would also propose the large exhibit *double helix,* either simply as two intertwined slides or better (in a not steep version) where one can pass from one helix to the other inside the structure.