Lecture 14: Chain rule

We walk on in a mountain region of height

$$f(x, y) = x + (2x^2 + 3y^2 - xy)$$

along the curve $\vec{r}(t) = [(1 + t), \sin(t)]$.

1 Find the rate of change of the height $\frac{d}{dt}f(\vec{r}(t))$ at the point $t = 0$ by differentiating the function $t \mapsto f(\vec{r}(t))$ of one variable.

2 Now find the gradient $\nabla f(\vec{r}(0))$ and the velocity vector $\vec{r}\,'(0)$ and use the chain rule to get the derivative again in a different way.