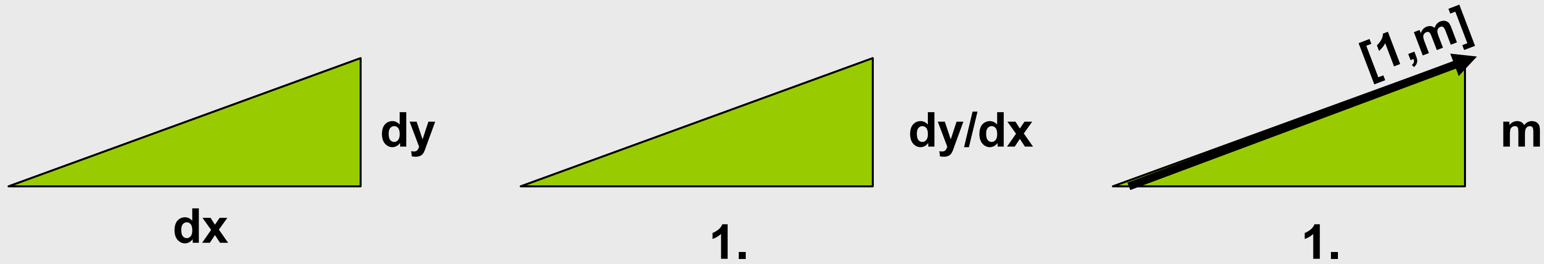
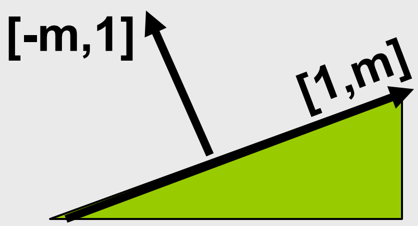
In 2D, a slope $m = dy/dx$. It can be expressed as the vector $[1,m]$.



The normal to the shape is the vector perpendicular to the vector slope:



Note that $[1,m] \cdot [-m,1] = 0$, as it must be.

So, if $z = -Amp * \cos(2\pi x/Pd - 2\pi Time)$, then the slope dz/dx is:

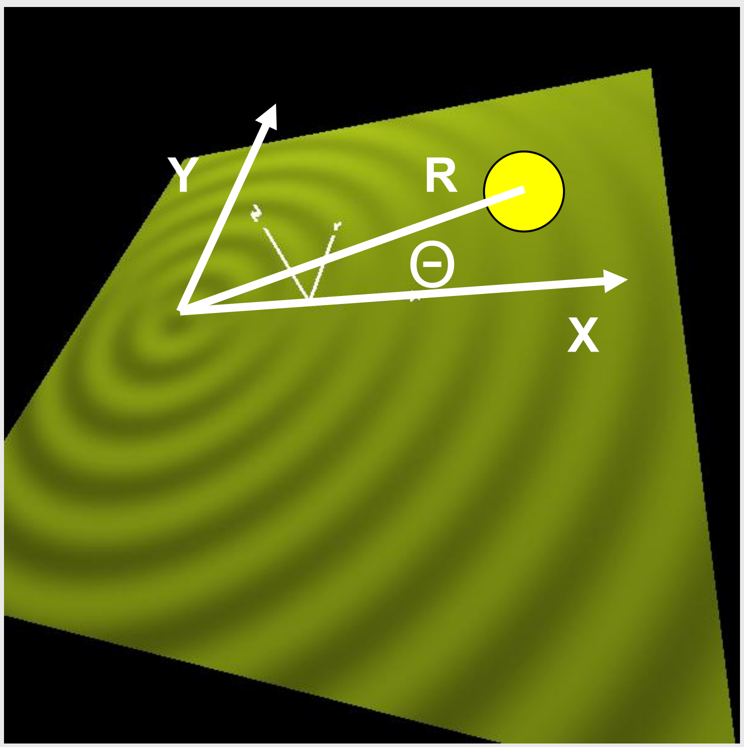
$$dz/dx = Amp * 2\pi/Pd * \sin(2\pi x/Pd - 2\pi Time)$$, and the vector slope is:

$$Slope = [\ 1.,\ 0.,\ Amp * 2\pi/Pd * \sin(2\pi x/Pd - 2\pi Time)\ ]$$

Following the pattern from before, the normal vector is:

$$[\ Normal\ ] = [\ -Amp * 2\pi/Pd * \sin(2\pi x/Pd - 2\pi Time),\ 0.,\ 1.\ ]$$

This is true along just the X axis. The trick now is to rotate the normal vector into where we really are. Because we are just talking about a rotation, the transformation is the same as if we were rotating a vertex.



$$Nx' = Nx * \cos\Theta - Ny * \sin\Theta = Nx * \cos\Theta$$

$$Ny' = Nx * \sin\Theta + Ny * \cos\Theta = Nx * \sin\Theta$$

$$Nz' = Nz = 1.$$

(Note that in the final version, you will substitute R for x in the slope equation)