

## Other (Ugly) Discontinuities

The limit  $\lim_{x \rightarrow 0} \sin(1/x)$  is undefined as  $x$  goes to 0. The graph of  $y = \sin(1/x)$  is similar to the one in Figure 1; the function  $\sin(1/x)$  has no left or right limit as  $x$  goes to 0. Here, we say the limit does not exist.

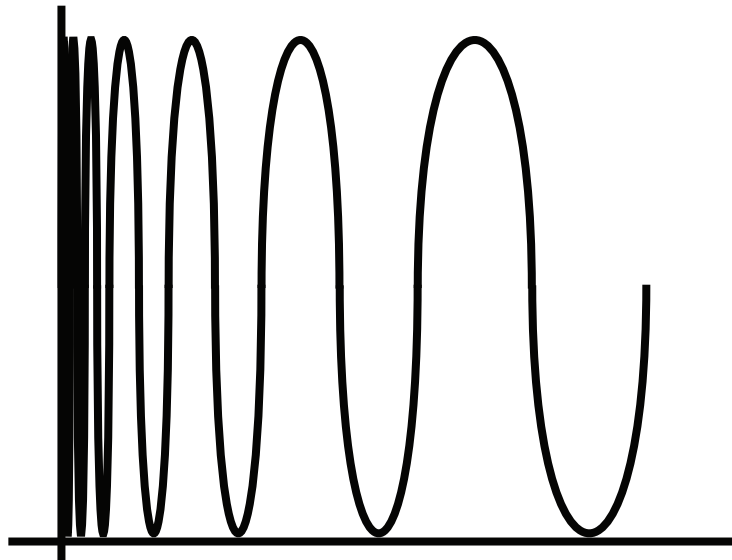


Figure 1: An example of an ugly discontinuity: a function that oscillates a lot as it approaches the origin

There are many discontinuities of this type — for example, things that oscillate as time goes to infinity — but we're not going to worry about them in this course.