

## DPGRAPH Assignment #8 - Math 260 – Towers

The purpose of this exercise is to use DPGRAPH help find out whether a limit exists for a function of the form  $z = f(x, y)$ .

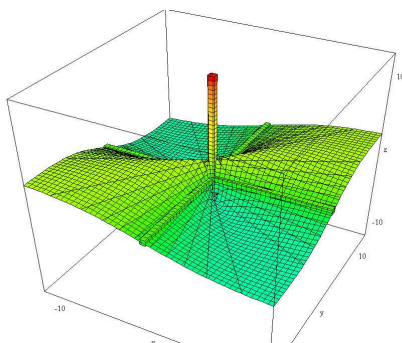
1. Open the file m260\_problem8.dpg, which is available at my website <http://www.miracosta.edu/home/jtowers/>. You should see a 2-dimensional surface. This is a plot of  $z = f(x, y) = 10xy/(2x^2 + 3y^2)$ . We are interested in determining whether or not  $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$  exists. From the plot, it should be clear that this limit does not exist.

2. Do this paper and pencil calculation, based on the plot you looked at in Step 1: Show that the limit discussed in Step 1 does not exist by taking the limit along two different paths of the form  $y = ax$ . In other words, use two different values of the constant  $a$  to get two different limiting values.

3. Use DPGRAPH to plot the function  $z = f(x, y) = x^2y/(x^4 + y^2)$ . Adjust the bounding box (and also the thickness of the coordinate axes) so that it is possible to see easily what is going on near the origin. It should be clear from the plot that  $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$  does not exist. Show that this limit does not exist by taking the limit along two different paths of the form  $y = ax^2$ .

Notes:

1. What you see when you originally open the dpgraph file m260\_problem8.dpg should look something like this:



2. You will be turning in **two** pencil-and-paper limit calculations, and **one** plot.