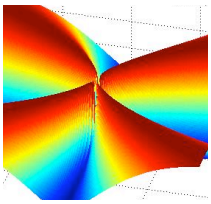
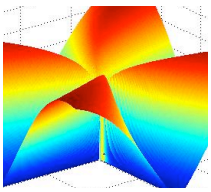


# M254H HW 5

## Due Monday Feb. 17

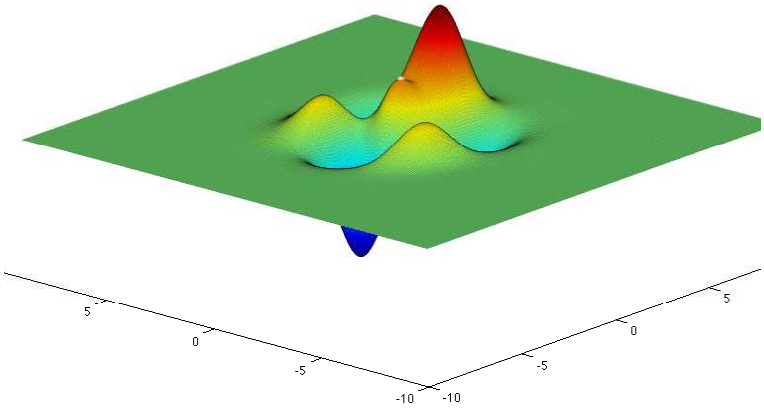


From Adams and Essex

| Chapter | Page Number | Problems |
|---|---|---|
| 12.3 | 687 | 7, 8, 10, 11, 13, 21, 33, 36 |
| 12.4 | 692 | 10, 16 |
| 12.5 | 702-703 | 15, 20, 29, 31 |

# Mini-Project 1 (Due March 10)

Consider a radio tower which is positioned a height $H > 0$ above the point $(x_0, y_0, f(x_0, y_0))$ on the topography given by the surface $z = f(x, y)$. For example, image a radio tower a height $H$ above the white star on the image below.




Devise an *efficient* algorithm to determine the points $(x, y) \in \mathcal{V}$ for which the corresponding point $(x, y, f(x, y))$ on the surface of the topography is within the direct line of sight of the radio tower. We will call $\mathcal{V}$ the set of visible points, with its complement being the set of hidden points. Your answer should

1) Identify the equations which determine the **boundary** of the set of visible points. That is, the points on the curves that separate the visible points from the hidden points. I strongly recommend that you do this first in two space dimensions where the surface is the $\{(x, f(x)) \,|\, x \in \mathbb{R}\}$.
2) Give a procedure to solve for the points which form the boundary of $\mathcal{V}$ (this part of the answer is fundamentally different in three space dimensions than in two space dimension). The goal is an explicit procedure to find the curves that divide visible points from the hidden points.