

ME 290-R, Prof. Sara McMains

Homework # 2

Due Friday March 1 5pm (slide hardcopy under my office door; email code to `mcmains@me.`(fill in the rest of the dept email address))

Feel free to discuss these problems with other students currently taking the class, but give them credit and describe their contribution in your writeup (e.g. “Fred had the insight that all cats are mortal and Sue pointed out that Socrates was mortal, but from there I figured out that Socrates was a cat on my own”) and write up your own work. You must do your own coding, however. DO NOT share any code.

1) Write a function to generate the ITO z-map for a ball end mill. Please make your function interface look like “function [*ito_surf*] = generate_ito(*dsurf_fname*, *spacing*, *diameter*)”, where *dsurf_fname* is the file name of the z-map matrix for the input design surface, *spacing* is the spacing between the z-map points in both the *x* and *y* directions, *diameter* is the diameter of the ball end mill, and *ito_surf* is the output z-map matrix for the ITO surface (of the same size as the input matrix).

Please use the center of the hemisphere of the ball end as the CL point, as in the paper. A sample input z-map file is provided on the website (“*dsurf.txt*”). You can test your program by calling `generate_ito(“dsurf.txt”, 0.0141, 0.5)` and then checking the values of the returned matrix (or rendering it using the `mesh` command).

Hint: As an intermediate step, you will probably want to construct a square matrix that is a z-map of the end of the inverted tool, with the center entry equal to the tool radius, and the other values that correspond to (*x*, *y*) positions within the tool footprint calculated using trigonometry.

2) Read Regehr’s blog entry on debugging linked on the class website. Tell us your favorite debugging story from your personal experience and relate it to the blog post (e.g. did you use one of the strategies described? Should you have, but didn’t know better? Or was a different strategy needed)?