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ECE 101-02 MATLAB and C Programming

Mr. Watchorn

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Mr. Watchorn,

Executive Summary

For this assignment, I have chosen to rewrite some equations I wrote code for in middle and high school. This is not a hypothetical for the email, I actually looked through my ti-84 and picked out a few old programs. I ended up choosing only geometry equations so that there would be a running theme between them, and because I liked geometry more than algebra.

Discussion

Equation 1: Law of Cosines

This equation is used to solve for any interior angle of a triangle given the length of each of its sides. This is an interesting case where my original ti-84 program is written with more complexity than the version attached to this assignment. This is because there is actually a second way to solve the equation that allows you to solve for one of the triangle’s sidelengths. My original program allowed the user to choose which way they would like to solve the equation, but parameterization is not yet a requirement for this project.

Equation 2: Sphere Volume

This equation is used to solve for the volume of a sphere given its radius. This could technically be solved using the diameter as well, but given that the radius is just the diameter divided by two, I elected not to include separate functionality.

Equation 3: Cylinder Surface Area

This equation is used to solve for the surface area of a cylinder given the height and radius of the cylinder. This equation first solves for the area of the curved surface, and then adds that to the area of the circular faces times two.

Equation 4: Cone Slant Height

This equation is used to solve for the height of the slanted portion of a cone given the radius and height of the cone. This was the most straightforward to implement because it essentially just uses the Pythagorean theorem.

Outcomes

Each script was tested with tested with 3-5 randomly generated sets of inputs, and each equation gave the correct output with each input set. My old ti-84 code was used alongside the calculator embedded in google to provide reference for pass/fail criteria.

NOTE: It is assumed that the user is only inputting positive values; negative values are impossible, and may produce unexpected results.

Conclusions

This was a valuable exercise to see how equations can be solved quickly and effectively in MATLAB. It especially improved my confidence in MATLAB’s usefulness, because these are equations that not only could be used in the real world, but have been used by me in my real life.

Thank you,

Dylan