Computational Methods in Additive Manufacturing

MECH-6024, MECH-5124

Group Assignment 7 (Group of 2)

To be worked in groups of two, include both names on the final report. Do not consult other groups.

Please show all steps of the algorithm and calculations

Due April 27, 2020 by 12 noon

The STL file of a CAD part is attached on Blackboard (Assignment7_stl) along the orientation shown in the figure below. Read the information from STL file. The part is manufactured with a uniform layer thickness of 1 mm. It was decided to change the final build orientation by rotating the part 30^0 with respect to the X-axis followed by a rotation of 45^0 with respect to the Y-axis.

Plot the STL file of the rotated part. Generate supports for this part using the ray shooting approach discussed in class. Discretize the points on the projected bounding box on the substrate with a spacing of 2 mm between points (rays) along the x and y direction. Depict a visualization of supports by plotting points along the support portion of each ray along with the STL of the part model. Approximate the support volume by multiplying the total length of the support rays and the square area represented by each ray (see new slide posted) on the substrate. Assume the support substrate is placed 10 mm below the lowermost Z-coordinate the transformed part. Please note that the build direction is always the positive z axis.