Readme: z_loss.m

Using information contained in a PiCUS® sonic tomogram, the MATLAB script 'z_loss' computes the percent reduction to the section modulus, Z (m3), for trees affected by decay. The script calls two functions, 'segment' and 'mcl,' that perform image segmentation and numerical integration required to compute estimates. The script and functions are commented extensively to explain the steps involved in the analysis. To execute, the program requires two image files and three numeric inputs, and the MATLAB image processing and mapping toolboxes are also required. The script requires both a tomogram image showing the visualized decay pattern (Figure 1, left) and a geometry image showing the blue trunk boundary line (Figure 1, right). The images should be oriented identically and exported without annotation from the PiCUS software. For optimum results, the images should be the same size and sufficiently large. The size of the exported images can be adjusted in the PiCUS software by changing the size of the window in which the tomogram is displayed.
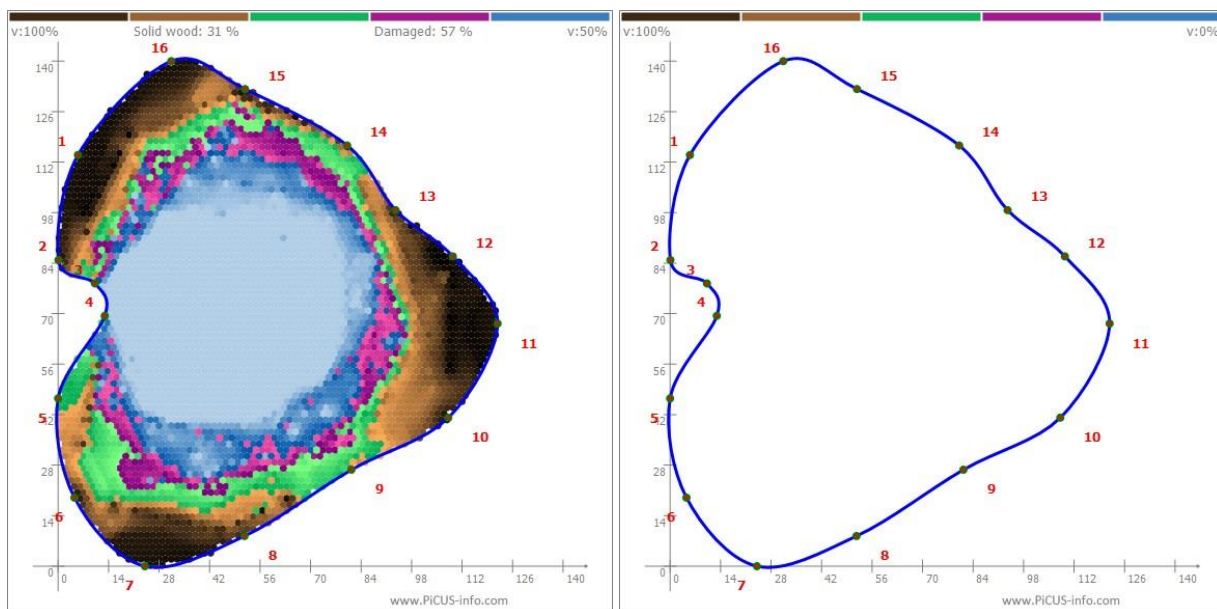

Figure 1

For the numeric inputs, the user must first specify whether to compute a liberal or conservative, respectively, strength loss estimate by excluding (Figure 2) or including (Figure 3) green when determining the extent of hollow parts.
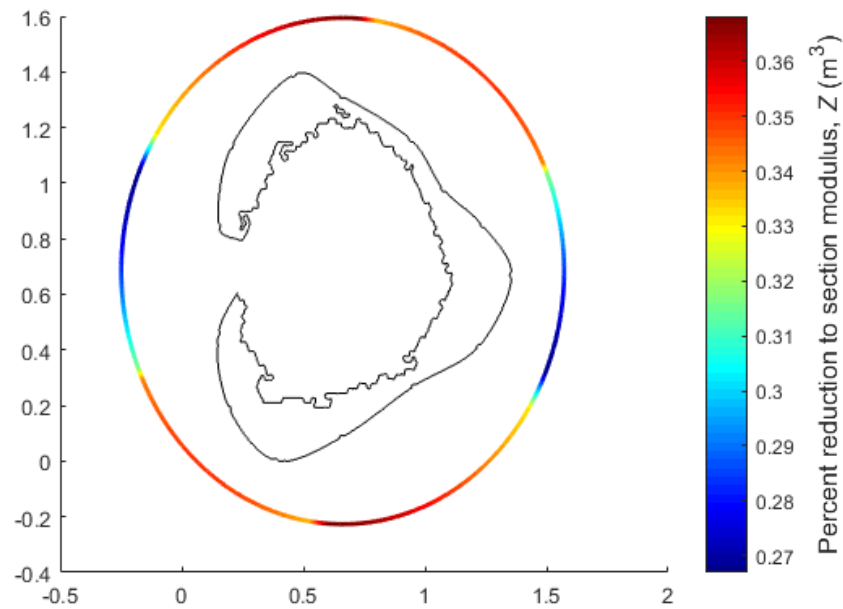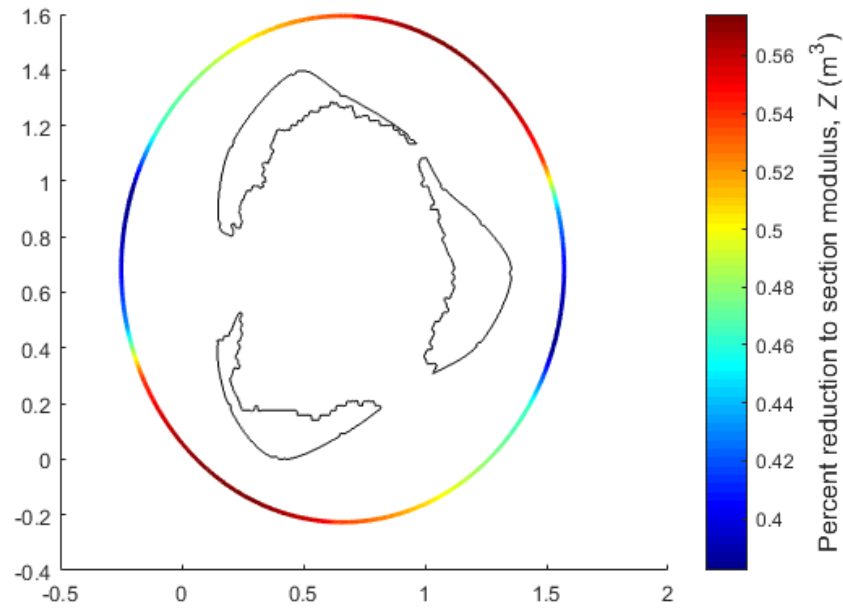
Figure 2

Figure 3

Finally, the user must specify the physical extent of pixels in the horizontal (x) and vertical (y) directions for both the tomogram and geometry image. This can be computed using the pixel indices of various tick marks on the x- and y-axis in each image. The results will be displayed using a color map projected onto a circular annulus. The strength loss values corresponding to various directions of loading can be referenced using the color bar.