Supplementary Material


1. Boundaries Process
Initial image filter 29x29 pixel image radius 14 pixels

Second filter 25x25 image radius 8 pixels

Third filter 13x13 pixel image radius 4 pixels

Adjust for maximum gradient and filter 10 iterations

Adjust for maximum gradient within a window of 4 pixels

Filter using the average of a window of 50 pixels

2. Initial Parameters Process
Step 1 finding a 3-peak pattern.

Peak 1 = 1st maximum value inner to the outer boundary and > .3* maximum value for the A-scan

Valley 1 minimum inner to peak 1

Peak 2 = maximum value inner to peak 1 and > .1* peak 1 amplitude

Valley 2 minimum inner to peak 2

Peak 3 = maximum value inner to peak 2 and > .1 * peak 2 amplitude

Distance between peak 1 and 3 > 8 pixels and < 15 pixels

Ratio of the distance between band 2 and 3 to the distance between band 1 and 3 is > 0.2 and < 0.8

Outliers are removed based on any peak being 50 pixels from the average for the peaks

Outliers are removed based a difference of 4 pixels from a moving average window of 6 pixels

Step 2 creating a center band
Connect and filter over a 10 pixel window
Iterate 10 times
Move to maximum value in 0.1 pixel steps
Filter with moving window average of 15 pixels

Step 3
Offset +/- 1 pixel for inner and outer band boundaries
Iterate 10 times
Move to maximum gradient in 0.1 pixel steps
Filter with moving window average of 15 pixels

3. Gaussian fitting process bands 2-4
Constraint values bands 2, 3, and 4
Thickness bias < 1 pixel and > 3 pixel or < 4 µm and > 12 µm Note: that this does not prevent values of thickness > 12 µm as indicated in table 3 band 4
Position change bias > 3 pixel or > 12 µm
Position order bias band to separate the center of band 2 and 3 and 4 and 5 by the sum of the sigma values
Positive amplitude bias < 0

4. Gaussian fitting process band 1
Constraint values for band 1
Thickness bias < .5 pixel and > 3 pixel or < 2 µm and > 12 µm
Position change bias > 3 pixel or > 12 µm
Positive amplitude bias < 0