

DigiOnco: A Pipeline to Unveil Digital Non-Invasive Biomarkers from Multi-parametric Radiomics Footprints

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Abstract—The abstract goes here.

Index Terms—Computer Society, IEEE, IEEEtran, journal, L^AT_EX, paper, template.



1 STUDY RESULTS

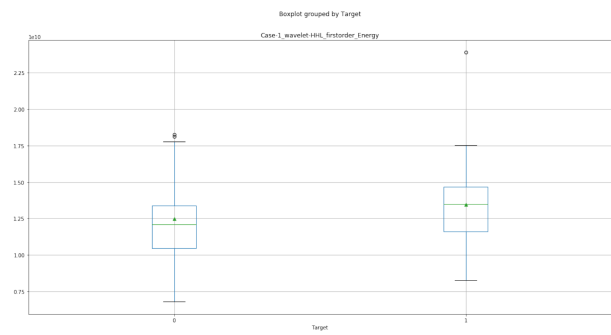
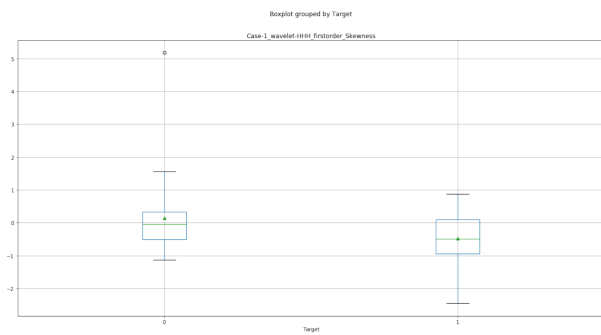
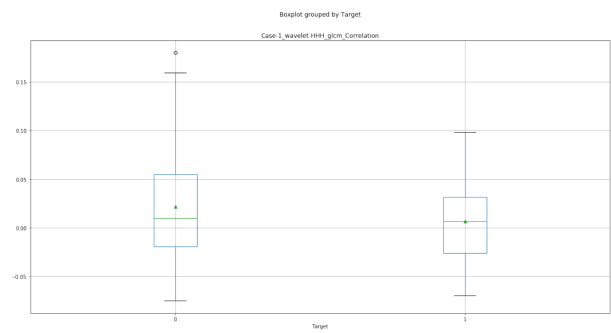
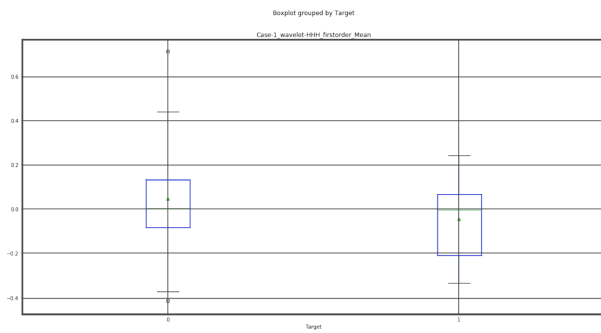
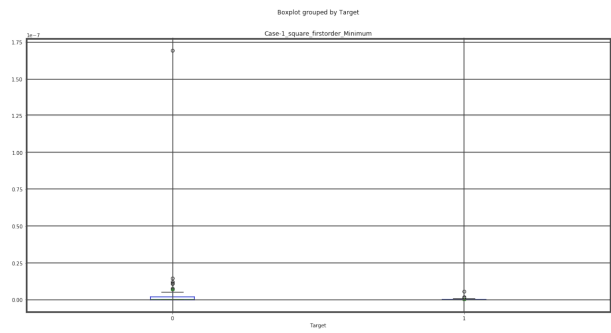
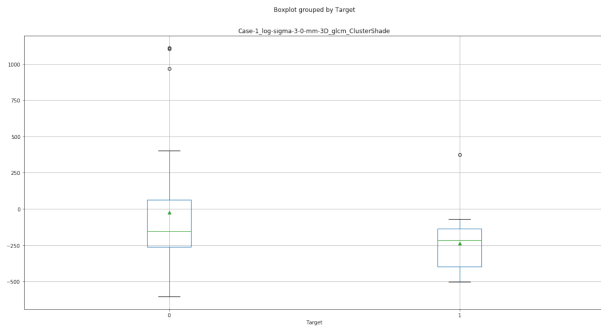
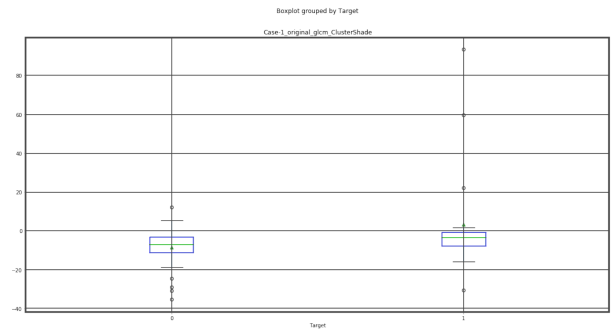
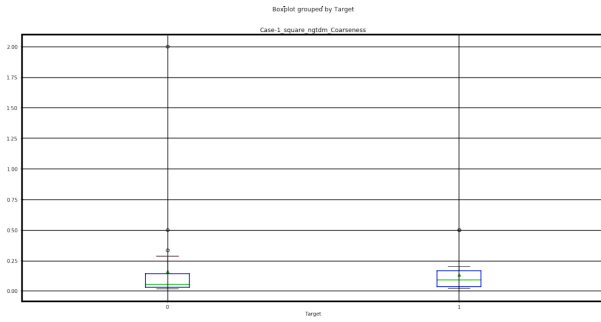
The following material describes the entire result set obtained during the study. To recapitulate, our study consisted of two classification tasks namely, TN vs Non-TN and TN vs Luminal-A vs HER. Once the training phase is completed the model configuration is loaded into the testing mechanism. The test data consisted solely of Luminal-B patients given the correlation of Luminal-A and Luminal-B data characteristics. The results described in the main material concludes at the training phase and provides a taste of the actual digital biomarkers obtained. Tables 1 and 2 provide a summary of the features selected after the pre-processing step. The selection is done mainly on the amount of distinguishing information each feature offers. Moreover, various filters have also been applied to provide a expansive view. The corresponding box plots having been shown in Figure Sets 1 and 2. Notice that not all box plots can be utilized optimally for distinuishing the different classes due to closeness in the measured value. To counter this problem, we introduced the concept of higher dimension plots which provide a user-friendly interface to the end user. A clear correlation can be established between the features and targets resulting in a more informed decision making stance.

TABLE 1
Final Feature Set for TN vs Non-TN

Sr. No.	Feature	Filter
1	Coarseness	Square
2	Cluster_Shade	Laplacian of Gaussian, Sigma = 3
3	Cluster_Shade	-
4	Minimum	Square
5	Mean	Wavelet = HHH
6	Skewness	Wavelet = HHH
7	Correlation	Wavelet = HHH
8	Energy	Wavelet = HHL
9	Energy	Wavelet = HLH
10	Mean	Wavelet = HLH
11	Skewness	Wavelet = HLH
12	Energy	Wavelet = HLL
13	Cluster_Shade	Wavelet = LHH
14	Energy	Wavelet = LLH
15	Energy	Wavelet = LLL
16	Skewness	Wavelet = LLH

TABLE 2
Final Feature Set for TN vs Luminal-A vs HER

Sr. No.	Feature	Filter
1	Kurtosis	Exponential
2	Cluster_Tendency	Square
3	Cluster_Prominance	Square
4	MCC	Square
5	Cluster_Shade	Square
6	Mean	Wavelet = HHL
7	Energy	Wavelet = HHL
8	Skewness	Wavelet = HLL
9	Energy	Wavelet = HLL
10	Energy	Wavelet = LHH
11	Energy	Wavelet = LHL
12	Cluster_Prominance	Wavelet = LLH
13	Skewness	Wavelet = LLH
14	Cluster_Shade	Laplacian of Gaussian, Sigma = 3
15	Cluster_Shade	-



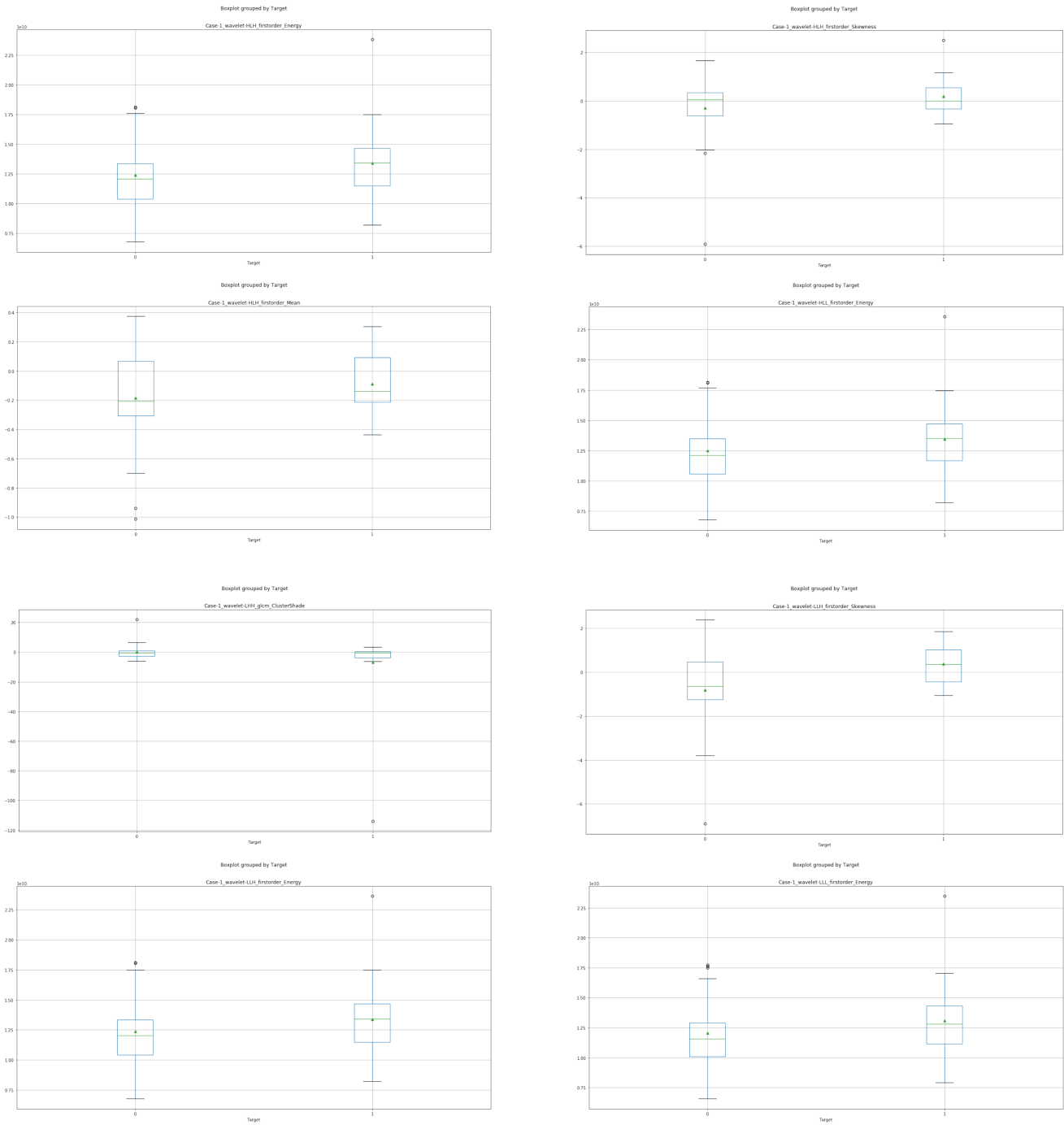
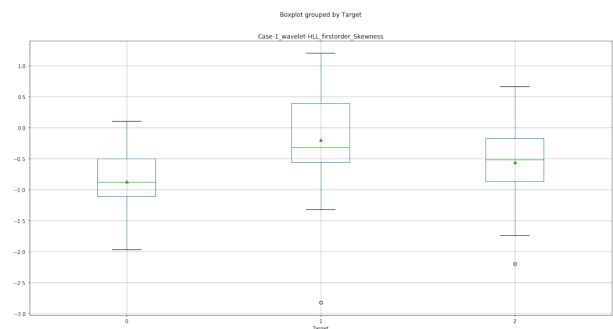
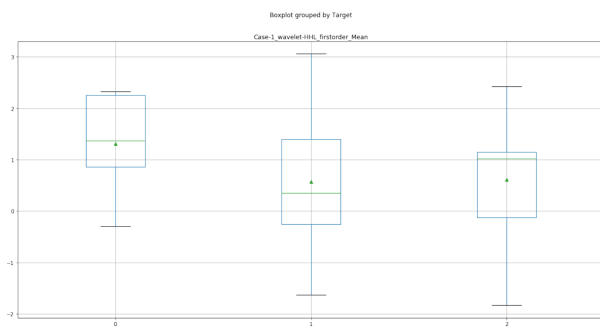
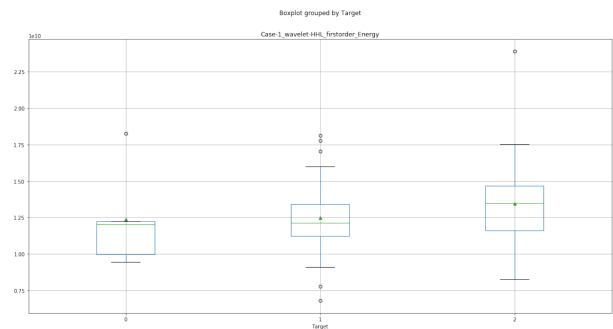
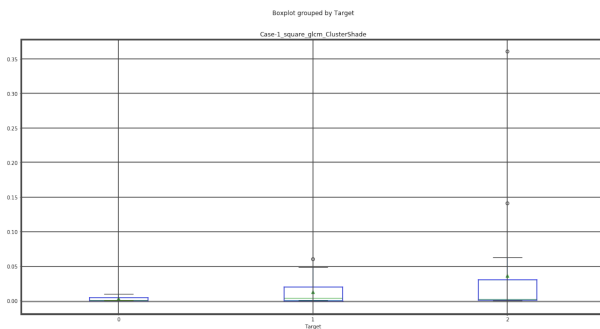
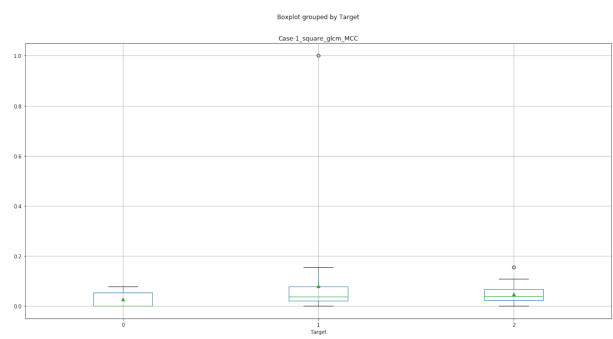
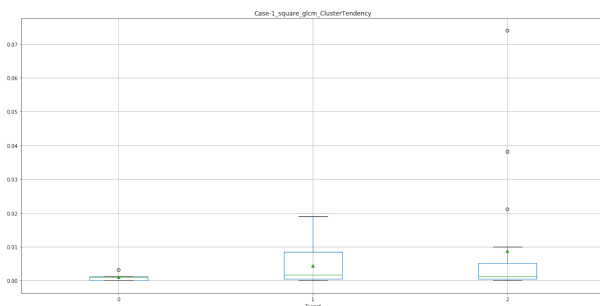
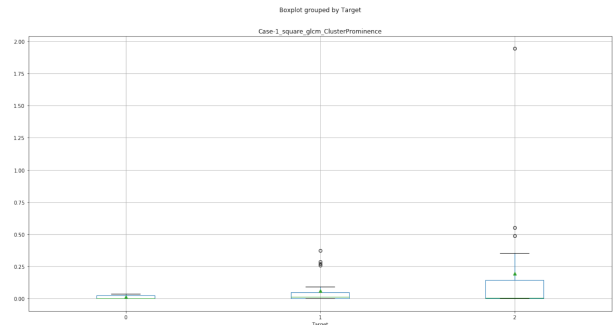
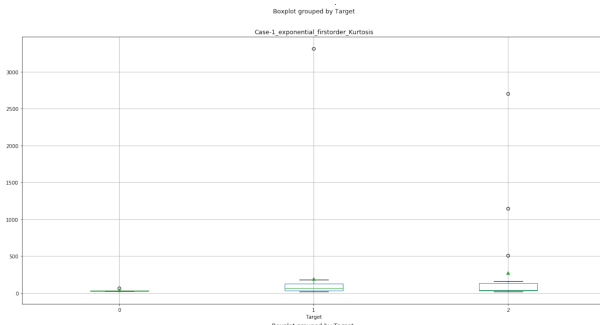


Fig. 1. Boxplots for TN vs Non-TN



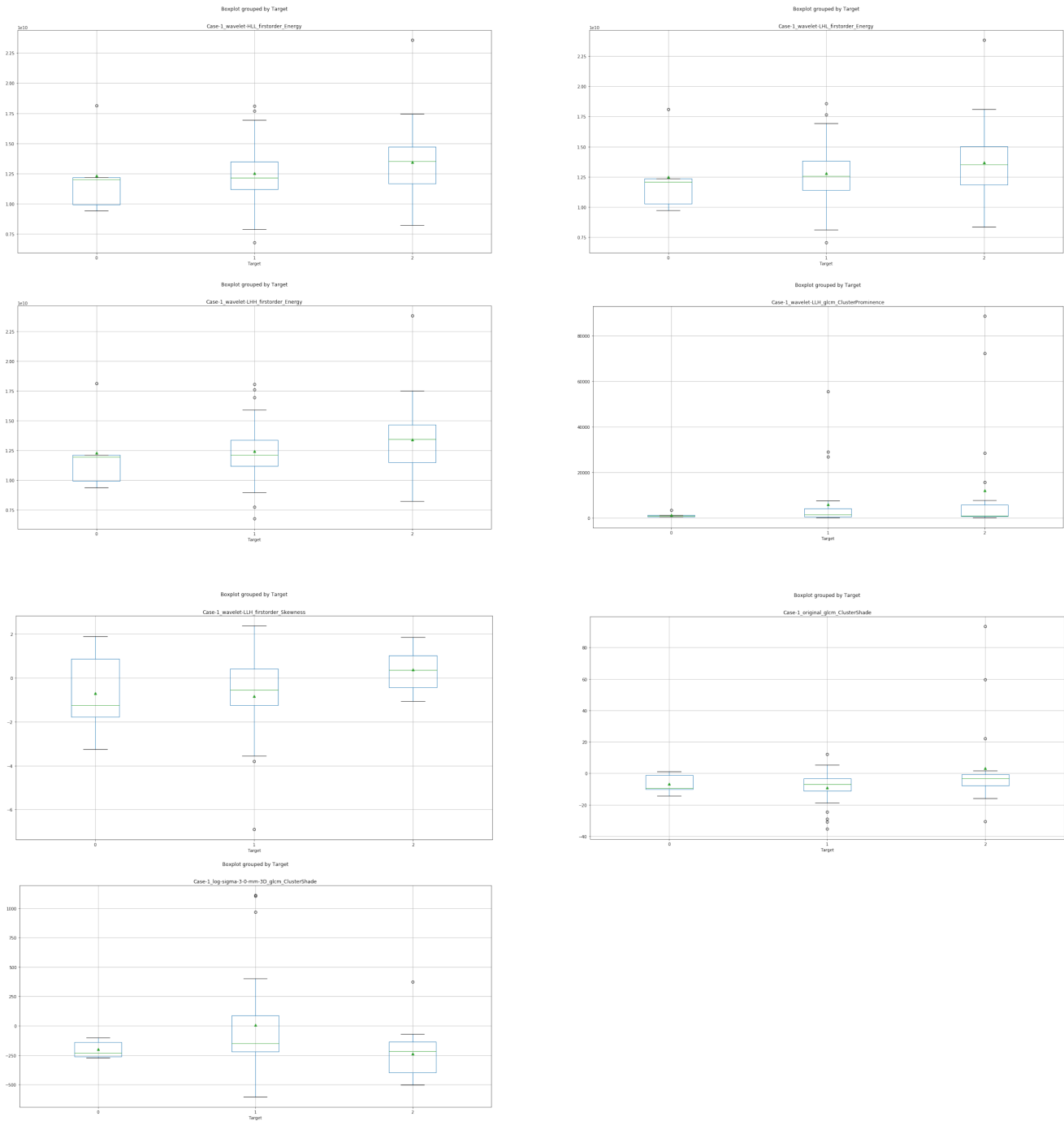


Fig. 2. Boxplots for TN vs Luminal A vs HER

The figure displays 10 line charts arranged in a grid, showing the evolution of various metrics across 100 iterations (x-axis, labeled 0 to 100). The y-axis for each chart represents the value of the metric. The metrics are:

- Case-1_log-sigma-3-0
- Case-1_wavelet-LH
- Case-1_wavelet-HL
- Case-1_wavelet-Skewness
- Case-1_wavelet-HL firstorder Energy
- Case-1_wavelet-HL firstorder Skewness
- Case-1_wavelet-HL firstorder Energy
- Case-1_wavelet-HL firstorder Skewness
- Case-1_wavelet-HL firstorder Energy
- Case-1_wavelet-HL firstorder Skewness

The charts show a general trend of convergence towards a target value of 1.0. The metrics are plotted against a common x-axis representing iterations from 0 to 100. The y-axis for each chart represents the value of the metric. The metrics are:

- Case-1_log-sigma-3-0
- Case-1_wavelet-LH
- Case-1_wavelet-HL
- Case-1_wavelet-Skewness
- Case-1_wavelet-HL firstorder Energy
- Case-1_wavelet-HL firstorder Skewness
- Case-1_wavelet-HL firstorder Energy
- Case-1_wavelet-HL firstorder Skewness
- Case-1_wavelet-HL firstorder Energy
- Case-1_wavelet-HL firstorder Skewness

Fig. 4. Ternary Higher Dimensional Plot