METHOD:

Dynamic time warping (DTW) was used to study the similarities in reach cycles of each animal. First, zero padding was done to make each reach cycle signals match maximum reach cycle period, this was done to keep the time distortion effect consistent across reaches. Matlab’s *dtw* function was used to perform DTW on individual reaches of an animal in order to bring the corresponding reach features at the same location on a common time axis. Later, DTW was done on average time warped signal of each animal to show group level reach features.

Figures below show that zero distortion does not change signal characteristics after DWT, instead it helps in keeping the time frame consistent for multiple signals with varying length.

 

~~Dr. Saab I just confirmed my code, I have not averaged the time in fact I have done zero padding the reason I have done it is to make this whole process unbiased by our time selection. Kindly check the figure below. Zero padding eliminates the need for us to truncate any signal above average time for dwt, below even though I have zero padded and made the signal around 27 points the time warping is still well aligned to a lower time point of round 15. Later when you average the signal these extra zero padded signal remain zero and we can truncate the final time series.~~