Acoustic emissions are affected by the natural frequency of the system. The shift in natural frequencies result in a shift in the acoustic emission spectra captured from a given source.

This is demonstrated through by changing the effective length of an aluminum plate, while keeping a fixed acoustic emission setup and source.

This is important because machine learning relies on pattern recognition; in the situation where a given source emits a different signal due to the change in the frequency respones of the material. This begs the question; are these changes in signal significant, and if so can ML framework be used effectively in spite of these changes.

As ML algorithms, became increaisng popular in nod-destructive evaluation of materials, particularly for addressing the task of damage mechanism identification. Careful consideration must be given to the grouping of signals. i.e. signals clustered together represent a given mechanism. To answer this question, we will consider how a signal may change over the course of a test.

It is well known that the natural frequency of a structure is influenced by the presence of cracks. However, it is unclear the relationship between natural frequency and acoustic emissions.

The speed dramatically reduces in a composite -> up to 50%. It is unclear what exactly drives the reduction in speed, but it is likely tied to a shift in natural frequency.

Experimental modal analysis is a parallel field for determining the dynamic characteristics of a structure, mode shapes and their natural frequencies.