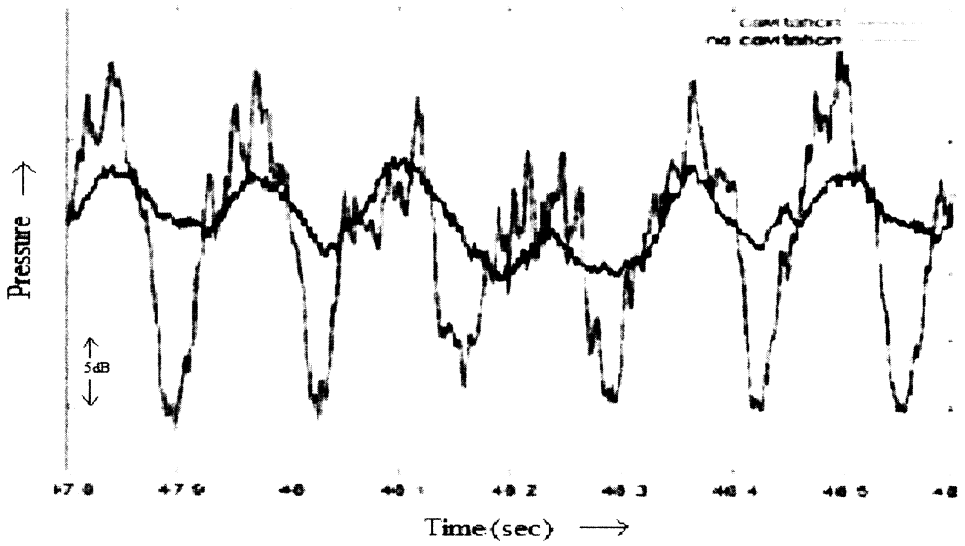

FIGURE 1. Cavitation Pressure vs Time

Fig.1 shows a typical time-domain data of propeller cavitation pressure levels with and without cavitation. Similarly a typical plot of such noise is shown in spectral domain in fig.2.

This plot clearly shows fundamental, harmonics, sub-harmonics, ultra harmonics with white noise background, all of which could be used to deduce information on the occurrence of cavitation process.

In particular, it is noted in the literature that occurrence of sub harmonics and ultra harmonics (odd integral multiples thereof) are considered as indicators of the threshold of inertial cavitation activity (explained in next session). But, from practical data it is not that simple to interpret these frequency components for indicators of inception of cavitation. As mentioned earlier, one way of monitoring of inception of cavitation is by measuring the sudden increase in noise level ($\sim$ of 10dB) accompanied by extra frequency components in the spectra. This type of monitoring does not tell about the hydrodynamic flow structure of cavitation volume which is generated by a set of propeller blades as they rotate at certain speed and beyond.

The objective of this paper is to present the use of HOS (Higher Order Spectral) analysis to detect, monitor and quantify the phenomenon of cavitation noise due to