

Abstract Submitted  
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**An experiment to determine the frequency response of hot-wire anemometers to velocity fluctuations** NICHOLAS HUTCHINS, JASON MONTY, IVAN MARUSIC, University of Melbourne, MARCUS HULTMARK, ALEXANDER SMITS, Princeton University — It has proven difficult in the past to test the true response of a hot-wire anemometry system to velocity fluctuations. In this set of experiments, exploiting the unique capabilities of the Princeton Supperpipe, a hotwire probe is exposed to a turbulent flow with a known spectral composition, but an adjustable frequency content. By comparing the measured result from the anemometer to the well-defined input, a transfer function (or Bode plot) of the true response to velocity fluctuations is obtained. Results indicate that for most commonly used anemometry systems the response measured by this process is reasonably close to that predicted by the square-wave test. However, in situations where precise measurements of turbulence are desired, we question the suitability of the 3dB drop-off to accurately characterise frequency response. One of the tested anemometers exhibits a measured frequency response to velocity fluctuations that differs substantially to the response indicated from electronic testing. Predicted errors due to frequency response for various anemometry systems will be presented for turbulent boundary layer measurements.

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