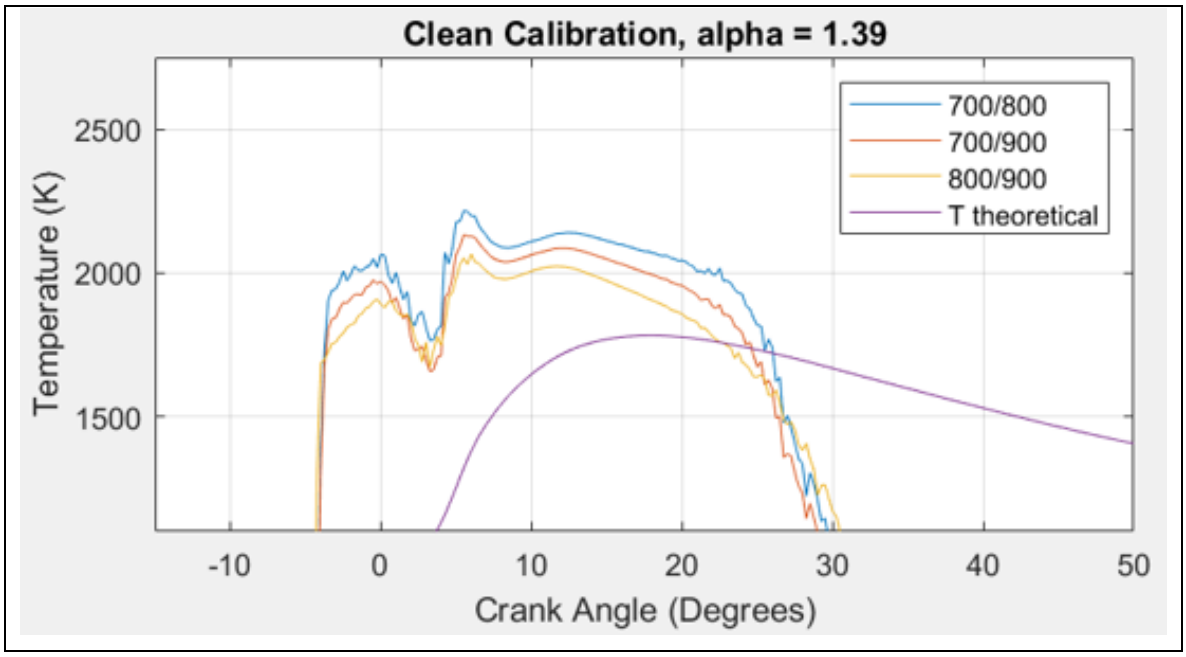
THREE-COLOUR PYROMETRY

Student: Nicolas Jaeger
Date: April 24th, 2020



ABSTRACT

Thermal imaging is becoming an ever more powerful tool for engineering applications that require the monitoring of high temperature systems. Measuring temperature optically has many benefits over traditional measurement techniques, such as the use of thermocouples or temperature probes. One benefit is the ability to measure from a distance, which allows for measurements of environments hot enough to melt traditional equipment. Another is the ability to record temperatures at high speed to capture measurements for fast processes, such as engine cycles. A third benefit is the ability to capture temperature data across an entire environment, as opposed to the localized data garnered from probes and thermocouples. A commonly used method for optically determining temperature is two-colour pyrometry. This technique compares the intensities of two known wavelengths emanating from a radiating body. However, this method has various flaws that can lead to inaccurate readings. As such, there is a desire to improve the quality of temperature readings for applications in which high accuracy and resolution is required. This project explores the feasibility of incorporating a third wavelength into the temperature measurement process as a means of validating the accuracy of a pyrometric system.