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High Speed Numerical Analysis of Experimentally Obtained Data via Low Power Computing Devices. Preliminary report.

Today in Numerical Analysis, it is extremely common to rely on high-level programming environments (such as Octave, MATLAB, and R) in order to make the process of analyzing large data sets easier. However, this introduces a bottlenecking effect which raises the time required to compute. In exchange, we allow ourselves to have easier to read and use code. In this presentation, we challenge the norm of “easy coding needs to be slow computing.” We present a derivation of a commonly used curve fitting method known as “Linear Least Square Regression.” We then provide an implementation of this regression algorithm in the C programming language. As proof of concept, we provide a visual of this algorithm using an old low power micro-controller called the “Nintendo GameBoy Advance,” (a.k.a. “GBA,” a computer over 50 times slower (in clock speed) than a Raspberry Pi 2, which in turn is much slower than a common laptop). All code is open source and hosted with video examples at: <https://github.com/akrodger/brams-math-methods/tree/regression-gba-demo> (Received August 16, 2017)