MATH 390.4 / 650.2 Spring 2019
Writing Assignment #1

Professor Adam Kapelner

Due 11:59PM Thursday KY604, April 18, 2019

(this document last updated 8:45am on Tuesday 26th March, 2019)

Pick one of the prompts and argue for one of the choices.

(a) The laws of physics are absolutely true /
The laws of physics are *not* absolutely true /
The laws of physics are *perhaps* absolutely true.

(b) There exists an all-powerful, all-knowing and timeless being or intelligence /
There does *not* exist an all-powerful, all-knowing and timeless being or intelligence /
There *perhaps* exists an all-powerful, all-knowing and timeless being or intelligence.

(c) Global warming is real /
Global warming is *not* real /
Global warming is *perhaps* real.

(d) The optimal human diet for health is [insert a diet here] /
The optimal human diet for health is *not* [insert a diet here] /
The optimal human diet for health is *perhaps* [insert a diet here].

(e) People who smoke contract lung cancer /
People who smoke do *not* contract lung cancer /
People who smoke *perhaps* contract lung cancer.

(f) Autonomous vehicles will navigate perfectly /
Autonomous vehicles will *not* navigate perfectly /
Autonomous vehicles will *perhaps* navigate perfectly.

It is your job to interpret the above prompts and redefine them in your own words, i.e. you must *limit*, *scope* and *concretize* the above which are *deliberately open-ended* and nebulous. To argueYou will need to formulate a model with phenomenon(s) that can be measured (explain how) and characteristics of the units under consideration. You will need to clearly define what "models" are and discuss their limitations. In the appropriate

context, you must write about the concepts we learned / will learn in class, including but not limited to $t, f, g, h^*, \delta, \epsilon, e, t, z_1, \ldots, z_t, \mathbb{D}, \mathcal{H}, \mathcal{A}, n, p,\ x_{\cdot 1}, \ldots, x_{\cdot p},\ x_{1\cdot}, \ldots, x_{n\cdot}, \mathcal{X}, y, \mathcal{Y}$, supervised learning, the fidelity of the measurement process, extrapolation, interpolation, stationarity, overfitting, validation (in-sample vs. out-of-sample), model selection, machine learning, etc.

Specs: Your essay should be at least 10 pages double-spaced with one inch margin, 12pt Times (or Computer Modern if using LaTeX) and be appropriately organized. Sectioning is at your preference.