DNS of Stratified Turbuluence with Rotation and Stochastic Forcing

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1 Previous Work

2 Current Work

3 Gaussian Processes

My current job is to design a stochastic forcing structure using the Gaussian random process. Gaussian Processes are a way of generating a regression from current data, fitting a line almost if you will. We are using gaussian processes to use the current data to inform a new point going forward in the code.

The concept of the Gaussian Process is not a novel idea. Its purpose is to generate new points which fit onto an informed window of uncertainty around a given set of initial data. Ultimately, the process samples a gaussian distribution whose mean and covariance matrices are created through the use of precise linear algebra and a kernel chosen to optimize on the desired properties of the gaussian regression.

The purpose of the Gaussian Process in the context of this work is to create a statistically stationary stochastic forcing in which to perturb and drive eddies in a stable manner as done in (Waite 2004) **SOURCE**. Ultimately blah blah blah. HEhe

$$G(k,t) = G_x(k,t) + G_y(k,t)$$
$$\vec{G}(k,t) \cdot \vec{k} = 0$$

4 Code Design and Algorithm Structure