Update to be included in slides for the next presentation: filling in the edges of an empty graph from distributions of Brownian Bridge sampling over the lattice

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1 algorithmic procedure

Motivation: We wish to describe a procedure for completing the edges between neighboring vertices of a graph with initial edge set $\mathcal{E}_i = \emptyset$. After executing such a procedure for an arbitrary graph $G = (V, E)$, we will iterate the procedure over each box $B^{\epsilon}_{x_i}$, for $x_i \in \mathbf{R}$, so that at the final stage of the algorithm after which all the edges of $\mathcal{G}^n$ have been filled, which precisely corresponds to $n-1$ iterations, we will be able to linearly search throughout the region $\mathcal{R}$ over which solutions to the nonlinear Navier-Stokes problem will be generated. After linearly exhausting the resulting collection of vertices in the set $\mathcal{V}^n$, either through a fixed, determininstic ordering of one's choosing of all points in $\mathcal{R}$, or through the use of a randomized algorithm with arbitrary hopping probability $p_{x_i \longrightarrow x_{i+1}} > 0$ from x_i to x_{i+1}, the transformed graph $\mathcal{G}^n$, obtained from the mapping $\Phi : G \longrightarrow \mathcal{G}^n$, besides classical procedures that have been carried out through Brownian sampling and through the compression of the sample space through classically realized symmetries, can be an area of this nonlinear problem, among others, that could experience quantum speed ups.

1.1 warming up the algorithm: inspecting vertices within fixed $B^{\epsilon}_{x_i}$

First, we begin our implementation from some fixed $v_i \in B^{\epsilon}_{x_i}$. From this fixed initial point and accompanying collection of times t_i on which the Brownian sampling is begun, define an arbitrary threshold parameter ϵ. After searching through nearest neighbor samples of the Brownian sampling distribution, collect all pairs of samples $W(t_i)$ and $W(t_j)$ for which $|W(t_i) - W(t_j)| < \epsilon$, satisfying $|t_i - t_j| = 1$.

1.2 correlating edges of the graph that are to be filled depending on the magnitude of the Brownian bridge sampling

Second, edges of the lattice graph will be completed as follows. For each instance in which we encounter a pair of nearest neighbor samples (see the conditions above) for which $|W(t_i) - W(t_j)| < \epsilon$, fill in an edge between x_{t_i} and x_{t_j}, with length $|W(t_i) - W(t_j)|$.

1.3 the end product: identifying subsets of the plane for which the density of the edges is the highest, weighed in the length of the edge constructed between subsequent Brownian samples

After repeating the previous 2 steps above indefinitely depending on the distribution of samples, and cardinality of total times t during which samples are drawn, one can identify the subregions of the plane for which the highest density of edges will occur, which is determined not only on the total number of instances for which the algorithm finds that the nearest neighbor sample difference is less than ϵ, but also on the length between the nearest neighbor samples, both of which are dependent on the variance δ of the Wiener process.