

Bachelor/Master Thesis Thesis: Gaussian Equivalent of Primitive Geometries

Topic

A tessellation or tiling is the covering of a surface, often a plane, using one or more geometric shapes, called tiles, with no overlaps and no gaps. In mathematics, tessellation can be generalized to higher dimensions and a variety of geometries. If one can have the Gaussian equivalent of primitive geometries in the probabilistic sense that have tiling properties one can have a Gaussian Mixture representation of the whole geometry which is something interesting to have due to probabilistic properties on Gaussian Mixtures.

Problem

If the space occupied by a primitive geometry is interpreted as the realization of a random variable that is uniformly distributed; what would be the Gaussian equivalent by some appropriate dissimilarity measure?

Prerequisite

- * Firm grasp over Multivariable Integration and Linear Algebra
- * PYTORCH or an equivalent NUMPY-like framework
- * Some exposition to Monte Carlo Methods and Elementary Geometry is advantageous

References:

- * Finite Dimensional Vector Spaces (Undergraduate Level) by Halmos
- * 100+1 Problems in Advanced Calculus by Toni, Lamberti, and Drago
- * Solving Problems in Mathematical Analysis, Part I by Radozycki
- * Solving Problems in Mathematical Analysis, Part II by Radozycki
- * Solving Problems in Mathematical Analysis, Part III by Radozycki
- * Exercises in Computational Mathematics with MATLAB by Lyche and Merrien

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