

# Why was Thought Curvature created?

## 1. Main point of the paper, and why is it an important contribution to machine learning literature?

I underline a [somewhat novel structure](#), Supermanifold in the regime of deep reinforcement learning, particularly Deep Boltzmann Machine in quantum computing.

Crucially, this is done because it is [demonstrably quite important that machine learning models are constrained in terms of biological brains to some degree](#), similar to how Deepmind uses biological brain constraints to produce novel machine learning architectures while leveraging old machine learning literature.

## 2. Evidence for the statements made in the thought curvature paper:

Based on (1) above, I [present a model](#) that compounds on Lie Superalgebras.

I underline that [novel machine learning models may compound on biological brain constraints](#), and I present the supermanifold based learning [paper](#), particularly because biological brains may be evaluated using supersymmetric operations, **[where supersymmetry is described to occur at brain scale, a scale relevant to machine learning in the goal of general intelligence](#)**. (See "[Supersymmetric methods in the traveling variable](#)" Perez et al. 2007)

It **is valid to express that supersymmetry is occurring at brain scale**, because notably, in the paper "[Supersymmetric methods in the traveling variable](#)", in the section "**Supersymmetry at the Brain Scale**", Robinson et al. are observed to obtain a simple damped wave equation, which describes how ***"axonal pulse fields propagate" at some speed between two populations, a and b, of neurons in the thalamocortical region of the brain.***

In the same section, [of the paper](#), on page 12, the authors derive a more accurate description of Robinson's equations, in the form of a Bessel diffusion aligned equation (equation 42).

Said formulation occurs such that the authors describe supersymmetric operations at brain scale in terms of neuronal pulses: "the velocity in the travelling variable of this diffusion is the same as the velocity of the **neuronal pulses** we identify it with the diffusion of various molecules, mostly hormones, in the extracellular space (ECS) of the brain, which is known to be necessary for chemical signalling and for neurons and glia to access nutrients and therapeutics occupying as much as 20 % of total brain volume in vivo".

**Pertinently, in the paper, the components that comprise the supersymmetric formulation were justified:** "This is justified because it was noticed by Wilson and Cowan that distinct anatomical regions of cerebral cortex and of **thalamic nuclei are functionally two-dimensional although extending to three spatial coordinates is trivial.**"