

# The Kolmogorov Superposition Theorem

## Key challenge

*Curse of Dimensionality*  
Approx. of  $f(x_1, \dots, x_n)$

## State of the art

Sparse Grids (Griebel)  
Tensor Train (Oseledets)

## New research direction

Construct Lipschitz  $\psi$  and  $\chi$  in

$$f(x_1, \dots, x_n) = \sum_{q=0}^{2n} \chi_q \left( \sum_{p=1}^n \lambda^p \psi(x_p + q\epsilon) \right)$$

## Potential scientific impact

Leverage 1D numerical analysis in HighD  
Guarantee complexity of HighD approximation