PASSAGGIO D'ANNO NANOSCIENZE

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Scuola Normale Superiore, Pisa

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NEST

SCUOLA NORMALE SUPERIORE

ACTIVITIES

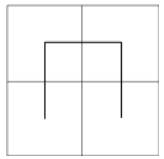
Courses

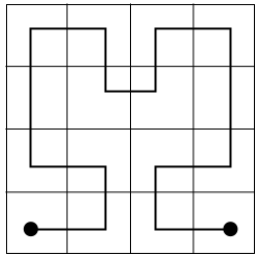
- Quantum Information Theory
- Quantum Technologies, Systems and Method
- Theory of Many-Body Systems

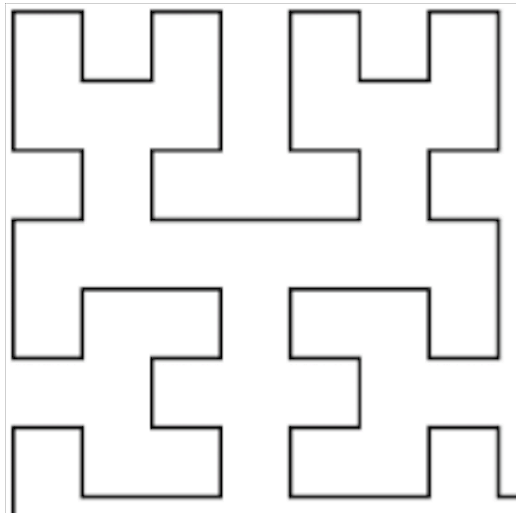
Other

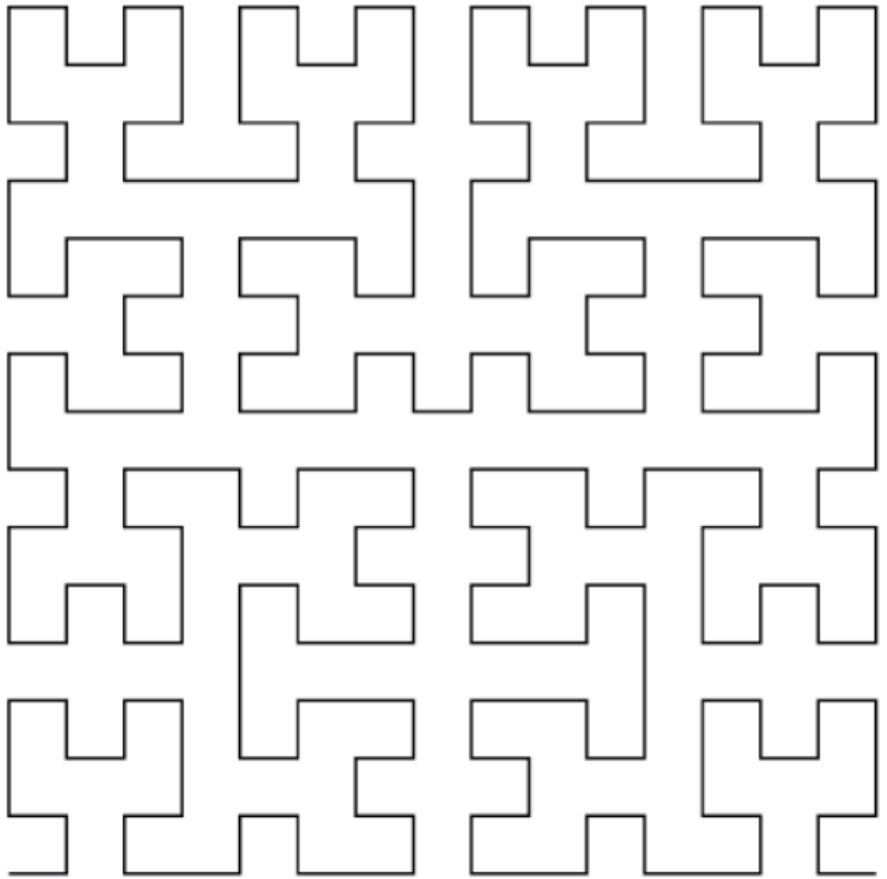
- Italian Language

HILBERT SPACE-FILLING CURVE

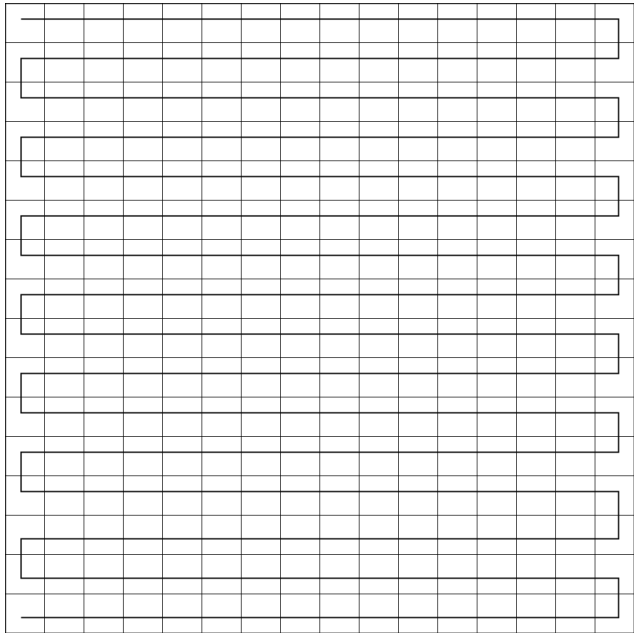


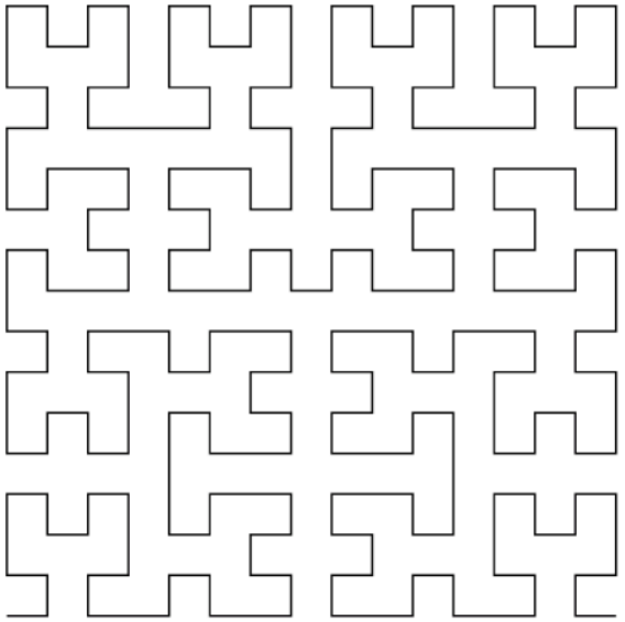


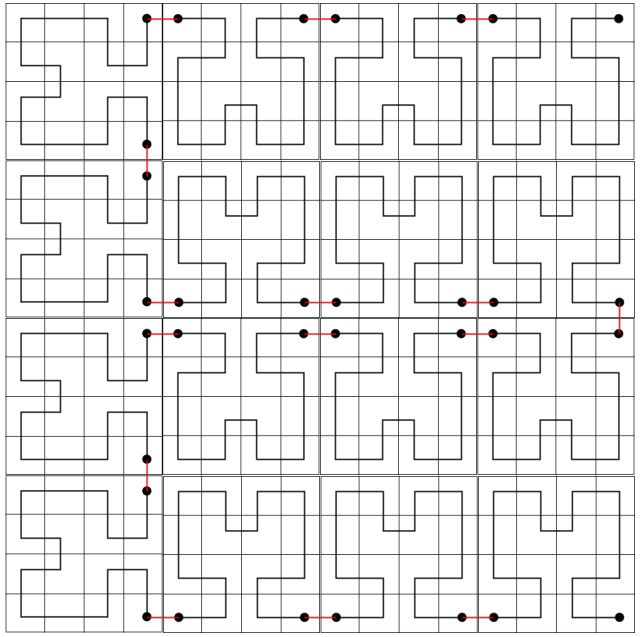


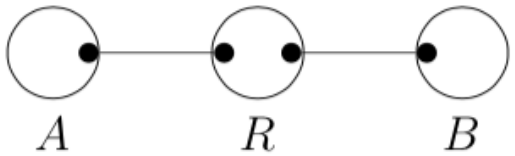


SNAKE – HILBERT - HYBRID







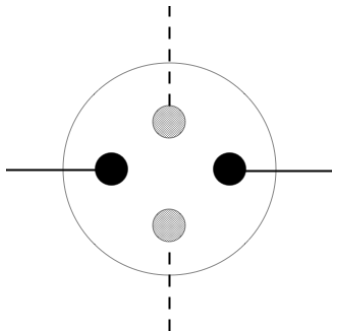


$$\rho = (\sqrt{a}|00\rangle_{AR} + \sqrt{b}|11\rangle_{AR}) \otimes (\sqrt{a}|00\rangle_{RB} + \sqrt{b}|11\rangle_{RB})$$

OBSERVATIONS

Hilbert	Snake	Hybrid	Shortcuts
$L_H(0) = 4^{n-1}$	$L_S(0) = 4^{n-1}$	$L_{Hy}(0) = 4^{n-1}$	$s = 0$
$L_H(4^j) \propto L_S(0)/2^j$	$L_S(s) \propto L_S(0)$	$L_{Hy}(2^j) \propto L_{Hy}(0)/2^j$	$s = 2^j << N$
$L_H(2^n) \propto 2^{3/2n}$	$L_S(2^n) \propto 2^n$	-	$s = 2^n \propto N$

1D Maps	New Graph
$(N^2+1)/3$	$(3/8)N < \overline{l_N} < 2N$
2	3
$N^2 - 1$	$N^2 - 1$



Increasing quantum memory in each node can improve network performance.

NEXT STEPS

Generalization to higher dimensions.

Bell pair generation between two points at a fixed distance of r.

Attempting to find the best arrangmenet of quantum resources.

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THANK YOU ☺