TikZ tensor network diagrams

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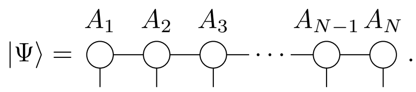
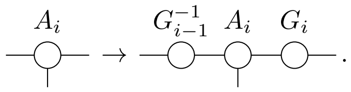
23 February 2024

Finite MPS:



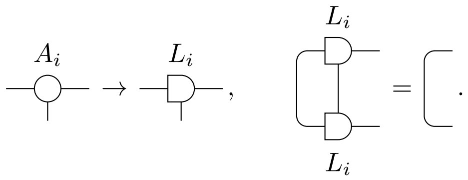
(1)

Gauge transform:



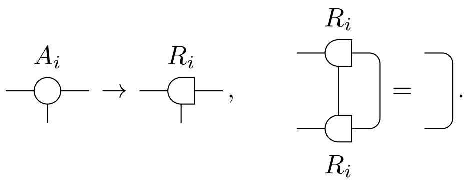
(2)

Left-orthogonal form:



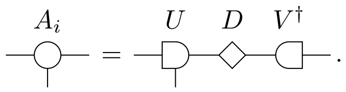
(3)

Right-orthogonal form:



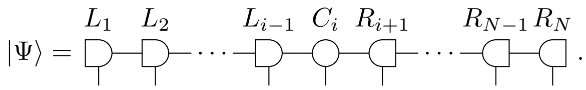
(4)

SVD:

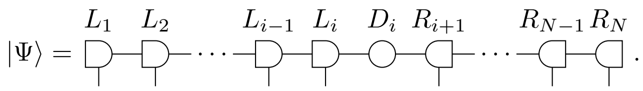


(5)

Mixed-canonical form:

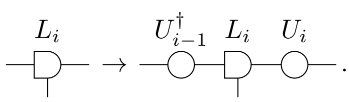


(6)



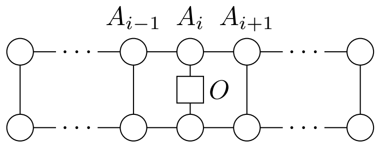
(7)

Unitary gauge transformation:

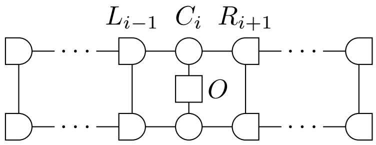


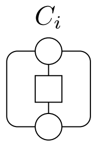
(8)

Expectation value:

$$\langle\Psi|O_i|\Psi\rangle =$$ 

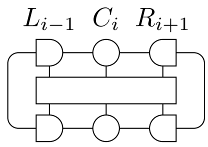
. (9)

$$\langle\Psi|O_i|\Psi\rangle =$$ 

$=$ 

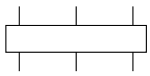
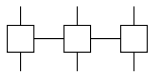
. (10)

Multi-site expectation value:

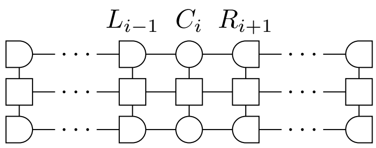
$$\langle\Psi|O|\Psi\rangle =$$ 

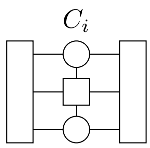
. (11)

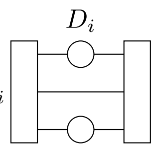
MPO:

 $=$  . (12)

MPO expectation value:

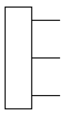
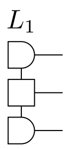
$$\langle\Psi|H|\Psi\rangle =$$ 

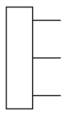
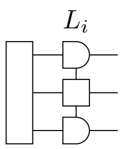
$= E_{i-1}$ 

$F_{i+1} = E_i$ 

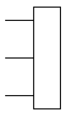
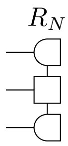
F_{i+1} . (13)

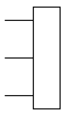
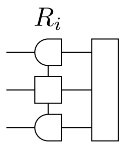
Environment tensors:

E_1  $\equiv$ 

, E_i  $\equiv E_{i-1}$ 

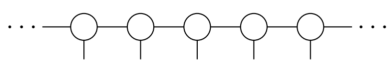
. (14)

 $F_N \equiv$ 

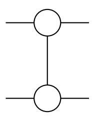
,  $F_i \equiv$ 

F_{i+1} . (15)

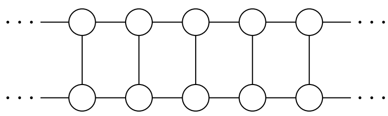
iMPS:

$$|\Psi\rangle =$$  . (16)

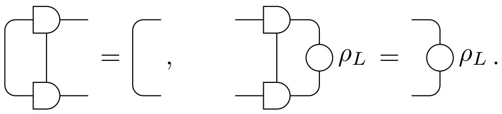
Transfer matrix:

$$T =$$  . (17)

MPS norm:

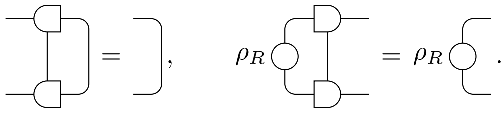
$$\langle\Psi|\Psi\rangle =$$  . (18)

Left-orthogonal form:



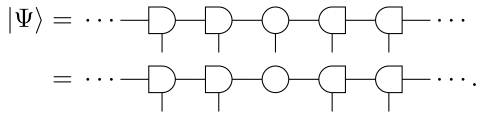
(19)

Right-orthogonal form:



(20)

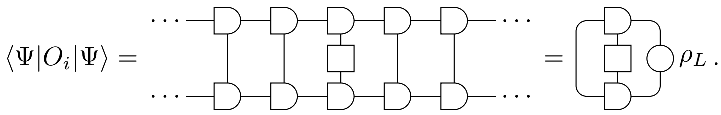
Mixed-canonical form:



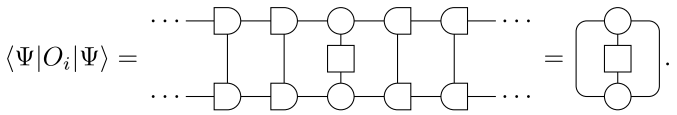
(21)

(22)

iMPS expectation value:

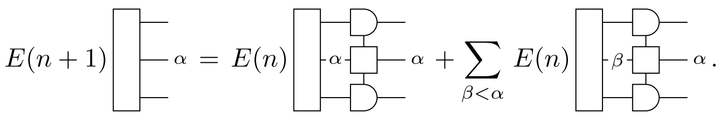


(23)



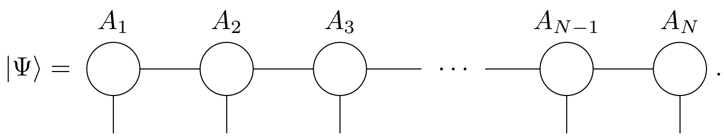
(24)

Environment tensor recursion relation:



(25)

Big diagram:



(26)

Inline diagram: