1 Structure

1.1 Input

1.1.1 Latex String (kw: ltx_str)

The Lindbladian as a Latex string in some form

e.g.

$-i\sum_{j=0}^{N-1}([\sigma_j^z,\rho])+\sum_{i,j=0}^{N-1}\gamma_{i,j}(\sigma_i^z\rho\sigma_j^z-\frac{1}{2}\{\sigma_j^z\sigma_i^z,\rho\})$

or

$-i\sum_{j=0}^{N-1}(\sigma_{j,ket}^z-\sigma_{j,bra}^z)+\sum_{i,j=0}^{N-1}\gamma_{i,j}(\sigma_{i,ket}^z\sigma_{j,bra}^z-\frac{1}{2}(\sigma_{j,ket}^z\sigma_{i,ket}^z+\sigma_{j,bra}^z\sigma_{i,bra}^z))$

...

1.1.2 Parameters (kw: params)

Any parameters that occur in the Latex string are defined here.

e.g.

{"t": t,

"mu": mu,

"sites": list(range(N)),

"NN": [(i, i+1) for i in range(N-1)]}

1.2 Output

A yastn.Mps object is returned

1.2.1 Procedure

Perform a series of translation of latex formulas until the _latex2term can handle it, all while expanding the formula and parameters accordingly during the process

Start with

$-i\sum_{j=0}^{N-1}([\sigma_j^z,\rho])+\sum_{i,j=0}^{N-1}\gamma_{i,j}(\sigma_i^z\rho\sigma_j^z-\frac{1}{2}\{\sigma_j^z\sigma_i^z,\rho\})$

resolve commutators

$-i\sum_{j=0}^{N-1}(\sigma_j^z\rho-\rho\sigma_j^z)+\sum_{i,j=0}^{N-1}\gamma_{i,j}(\sigma_i^z\rho\sigma_j^z-\frac{1}{2}(\sigma_j^z\sigma_i^z\rho+\rho\sigma_j^z\sigma_i^z))$

extract

$-i\sum_{j=0}^{N-1}(\sigma_{j,ket}^z-\sigma_{j,bra}^z)+\sum_{i,j=0}^{N-1}\gamma_{i,j}(\sigma_{i,ket}^z\sigma_{j,bra}^z-\frac{1}{2}(\sigma_{j,ket}^z\sigma_{i,ket}^z+\sigma_{j,bra}^z\sigma_{i,bra}^z))$

rephrase summation

$-i\sum_{j,jk,jb\in 1range0toN-1}(\sigma_{j,ket}^z-\sigma_{j,bra}^z)+\sum_{i,j,ij,ib,jk,jb\in 2range0toN-1}\gamma_{i,j}(\sigma_{i,ket}^z\sigma_{j,bra}^z-\frac{1}{2}(\sigma_{j,ket}^z\sigma_{i,ket}^z+\sigma_{j,bra}^z\sigma_{i,bra}^z))$

rename (greek) symbols (modify parameters)

$-i\sum_{j,jk,jb\in 1range0toN-1}(z_{j,ket}-z_{j,bra})+\sum_{i,j,ij,ib,jk,jb\in 2range0toN-1}gamma_{i,j}(z_{i,ket}z_{j,bra}-\frac{1}{2}(z_{j,ket}z_{i,ket}+z_{j,bra}z_{i,bra}))$

extract constants (added to params)

$-imun\sum_{j,jk,jb\in 1range0toN-1}(z_{j,ket}-z_{j,bra})+\sum_{i,j,ij,ib,jk,jb\in 2range0toN-1}gamma_{i,j}(z_{i,ket}z_{j,bra}-1div2(z_{j,ket}z_{i,ket}+z_{j,bra}z_{i,bra}))$

resolve ket/bra-marked operators by removing notation and complex conjugating bra-marked ops (and adding respective operators to parameters)

$-imun \sum_{j,jk,jb \in 1range0toN-1}(z_{jk} - zcc_{jb}) + \sum_{i,j,ij,ib,jk,jb \in 2range0toN-1} gamma_{i,j}(z_{ik}zcc_{jb} - 1div2(z_{jk}z_{ik} + zcc_{jb}zcc_{ib}))$
where with the help of a a cConjugate(op) method $zcc_j = cConjugate(z)_j = z_j^*$.

which should then yield the respective output through the latex2term-, term2HTerm- and generate_mpo-methods