Cluster update for tensor network states[1] LING WANG,
FRANK VERSTRAETE, Faculty of Physics, University of Vienna, IQI
TEAM — We propose a novel recursive way of updating the tensors in
projected entangled pair states by evolving the tensor in imaginary time
evolution on clusters of different sizes. This generalizes the so-called
simple update method of Jiang et al. [Phys. Rev. Lett. 101, 090603
(2008)] and the updating schemes in the single layer picture of Pizorn
et al. [Phys. Rev. A 83, 052321 (2011)]. A finite-size scaling of the
observables as a function of the cluster size provides a remarkable im-
provement in the accuracy as compared to the simple update scheme.
We benchmark our results on the hand of the spin 1/2 staggered dimer-
ized antiferromagnetic model on the square lattice, and accurate results
for the magnetization and the critical exponents are determined. Refer-
ence L. Wang and F. Verstraete, arXiv:1110.4362.

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