Title:	Variational Qunatum Algorithms and their implementation on NMR Quantum Information Processor
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Abstract:	Quantum computing holds promise for various applications which are intractable with clas- sical computers. This has motivated scientists and engineers to come together and build the necessary hardware for the implementation of quantum algorithms on large scale to exper- imentally demonstrate quantum advantage. But current state of art hardware is still noisy and limited by the number of qubits. Therefore, we call them noisy intermediate scale quantum (NISQ) devices. Variational Quantum algorithms (VQAs) are emerging to be a promising candidate to show quantum advantage with current NISQ devices. The quest to exploit the available hardware to the fullest is on. Taking motivation from this, we have used variational quantum real-time evolution algorithm to simulate the dynamical properties of a few site spin systems. We also studied Variational Quantum Imaginary time evolution and used it to calculate the ground and excited state of a given system. On the same line, the bond length of H 2 molecule is calculated. Towards the end, it has been discussed how both of these algorithms can be used together to simulate finite temperature dynamical properties of a given system.
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