Title:	Non-lattice simulations of supersymmetric yang-mills theories
Authors:	Tripathi, Ashutosh
Keywords:	yang-mills theories supersymmetric
Issue Date:	Apr-2022
Publisher:	IISER Mohali
Abstract:	Lattice simulations of supersymmetric gauge theories is not straightforward. In this thesis, we propose a non-lattice method as an alternative to the conventional lattice approach for studying supersymmetric gauge theories. To gain some insight into this non-lattice approach, we first apply it to the supersymmetric anharmonic oscillator model, which is a non-gauge theory and well-studied with the lattice formalism. We extracted the bosonic and fermionic mass gaps from the exponential decay of two-point correlators and compared the results with those ob- tained from lattice approach. Our simulations also confirm that the SUSY is preserved for the model. Then, we simulated the bosonic and supersymmetric (SUSY) matrix quantum mechanics model with four supercharges. We used the Polyakov loop as an order parameter to investigate the phase structure of the models at finite temperatures. Our simulations confirmed that the bosonic case exhibits a confinement-deconfinement phase transition as the temperature changes, but the SUSY model always remains in the deconfined phase. Other observables, such as internal en- ergy and space extent, were also computed in addition to the Polyakov loop. Our plots also agreed well with the high-temperature expansion results.
URI:	http://hdl.handle.net/123456789/4179
Appears in Collections:	MS-17

Files in This Item:

File	Description	Size	Format	
Yet to obtain consent.pdf		144.56 kB	Adobe PDF	View/Open