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Applications of Machine Learning in Constraining Multi-Scalar Models

Machine learning techniques are used to predict theoretical constraints—such as unitarity, boundedness from below, and the potential minimum—in multi-scalar models. This approach has been demonstrated to be effective when applied to various extensions of the Standard Model that incorporate additional scalar multiplets. A high level of predictivity is achieved through appropriate neural network architectures, learning algorithms, and well-prepared training datasets. Machine learning offers a significant computational advantage by enabling faster computations compared to other numerical methods, such as scalar potential minimization. This research investigates the potential of machine learning as an alternative approach for predicting these constraints, potentially improving upon traditional numerical techniques.

AI keywords

dataset creation; training; pattern recognition; integration of physics and ML

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