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Deep learning as a unified model-selection tool

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Experimental results from hadron-hadron scatterings or decays are usually interpreted by using some phenomenological models. The conventional model-fitting scheme cannot give us a definitive answer because different models can give almost similar goodness of fit. In our work, we show that deep learning can be used as a unified model-selection tool. We prepared 35 pole-based models and train the deep neural network to identify the most likely pole configuration of a given experimental data. Using the elastic pion-nucleon scattering as the experimental data, we generate 10^6 inference amplitudes and fed them directly to the trained neural network. We found that out of the 35 pole-based models, only 4 models are identified. We also show that the result of inference is independent on the generation of inference amplitudes.

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