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Spectral analysis for nucleon-pion and nucleon-pion-pion states in both parity sectors using distillation with domain wall fermions

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We present a study using the distillation method to analyze the spectra of nucleon, nucleon-pion, and nucleon-pion-pion states in the positive parity sector as well as nucleon and nucleon-pion states in the negative sector. The study involves using five domain wall fermion ensembles with varying pion masses ($m_\pi = 139\text{--}279\text{ MeV}$), lattice spacings ($a^{-1} = 1.730\text{ GeV}$ and $a^{-1} = 2.359\text{ GeV}$) and volumes ($m_\pi L = 3.84\text{--}7.59$). To tackle the large number of contractions in this project, we implemented an algorithm to automate the contraction of general nucleon pion correlation functions containing an arbitrary number of pions.

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