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An improved selection optimization method used for the measurement of ZZ production under conditions of ATLAS experiment during LHC Run ll.

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The production of a pair of Z-bosons in the $ll\nu\nu$ channel ($l = e, \mu$) is studied with the conditions of proton-proton collisions at a centre-of-mass energy of 13 TeV. The generation of signal and background events is performed using the MadGraph5_aMC@NLO Monte Carlo event generator. The Pythia8 and Delphes3 frameworks are used for event showering, hadronization, and detector response simulation.

This report describes an improved cut-based optimization method to maximize signal significance, where signal significance is considered as a multivariate function of the optimized variables.

The described method makes it possible to find the best combination of cuts for kinematic variables corresponding to the best signal/background ratio. An additional option of the method is the ability to find cuts that satisfy various conditions, such as a limit on the number of minimum signal events.

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