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Combination of multivariate discrimination methods in the measurement of the inclusive top pair production cross section

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The application of multivariate analysis techniques in experimental high energy physics have been accepted as one of the fundamental tools in the discrimination phase, when signal is rare and background dominates. The purpose of this study is to present new approaches to the variable selection based on phi-divergences, together with various statistical tests, and the combination of new applied MVA methods together with familiar ROOT TMVA methods in the real data analysis. The results and quality of separation of the Generalized Linear Models (GLM), Gaussian Mixture Models (GMM), Neural Networks with Switching Units (NNSU), TMVA Boosted Decision Trees, and Multi-layer Perceptron (MLP) in the measurement of the inclusive top pair production cross section employing $D0$ Tevatron full RunII data ($9.7 fb^{-1}$) will be presented. Possibilities of improvement in discrimination will be discussed.

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