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Parameterization of Parton Distributions Functions Based on Self-Organizing Maps Y. LOITIERE, H. HONKANEN, S. LIUTI, University of Virginia — Neural network algorithms have been recently applied to construct Parton Distribution Functions (PDFs) parametrizations which provide an alternative to standard global fitting procedures [1]. In this contribution we propose a different technique, namely an interactive neural network algorithm using Self-Organizing Maps (SOMs) [2]. SOMs generate a nonuniform projection from a high dimensional data space onto a low dimensional one (usually 1 or 2 dimensions) by clustering similar PDF representations together. Our SOMs are trained on progressively narrower selections of data samples. The selection criterion is that of convergence towards a neighborhood of the experimental data. Our procedure utilizes all available data on deep inelastic scattering in the kinematical region of $0.001 \leq x \leq 0.75$, and $1 \leq Q^2 \leq 100$ GeV^2, with a cut on the final state invariant mass, W$^2 \geq 10$ GeV^2. Our main goal is to provide a fitting procedure that, at variance with standard neural network approaches, allows for an increased control of the systematic bias. SOMs, in fact, enable the user to directly control the data selection procedure at various stages of the process.

[1] L. Del Debbio, S. Forte, J. I. Latorre, A. Piccione and J. Rojo, [NNPDF Collaboration], JHEP **0503**, 080 (2005).
[2] T. Kohonen, "Self Organizing Maps," Springer-Verlag, 1997.

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