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GNA: data flow approach for the neutrino oscillation experiments

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GNA is a framework dedicated for building and fitting large scale models related to the neutrino oscillation physics. The core is written in C++ and operated from within Python. Following the data flow paradigm the model is built as a directed acyclic graph. Each node of the graph represents a function that operates on a vectorized data and depends on a few parameters. Any part of the graph is evaluated lazily. A library of transformations, implementing various functions, including vectorized integration and interpolation, is precompiled. While the approach is ideologically similar to the one, used within ML field (TensorFlow/zfit, PyTouch), one of the key differences is a requirement to build non-uniform models containing a large number of elements. The framework enables the user to build incomplete and independent parts of the model and combine them into a single graph, by describing its structure as a mathematical expression. The description of the framework as well as practical examples from the JUNO experiment will be presented.

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Classification de Session: Workflows