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Analysis of 1/Nc corrections in the quark model using the example of the pion transient form factor

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Transitional pion form factor; 1/Nc corrections; nonlocal quark model

The fundamental theory of strong interactions is quantum chromodynamics. In the low-energy area, the strong coupling constant is not a small parameter, so the use of methods that do not use perturbation theory, for example, effective quark models, is required.

One of such models is the nonlocal quark model [1]. The model is based on expansion in terms of the inverse number of quarks (1/Nc). When considering the diagram technique within the framework of the model, it turns out that any meson propagator in the diagrams leads to a suppression coefficient of 1/Nc [2].

A large number of diagrams with 1/Nc corrections leads to the need to automate the calculation process. The following calculation program is currently implemented:

• The initial stage of generating diagrams is carried out in the QGRAF program [3]

• A program was written for processing data generated by QGRAF, where an algorithm for selecting diagrams by 1/Nc-indices was implemented

• Classification of diagrams into certain types has been made

• Subsequently, the expressions are transferred to the FORM analytical calculation program

Using the program, the transition form factor of the pion was considered [4].

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