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Tornado-type stationary vortex with nonlinear term due to asymmetric moisture transport

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In this work we consider a tornado-like vortex in atmosphere. It is wildly accepted that tornado is essentially nonlinear phenomenon but there are a lot of nonlinear terms in the hydrodynamic system and so far no one has found the right nonlinear term that is necessary for tornado phenomenon theoretical description. We consider a nonlinear term associated with atmosphere humidity. This term yields energy to the system (in contrast to the usually considered inertial terms) and is very suitable for such a problem. Even in the simplest case the system proves to be rather complicated it reduces to boundary problem of a nonlinear differential equation of the sixth order. To solve his problem we used the method of determining the given boundary conditions on one of the boundaries due to the boundary conditions on other side. The work was supported by the RFBR grant No.09-05-00374-a.