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**Short title:** Constraint preserving schemes using potential-based fluxes I. Multidimensional transport equations.

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**Review text:**

The authors consider constraint preserving multidimensional first order hyperbolic equations with a nonlinear flux function. Finite volume schemes are designed in order to approximate these equations in a stable manner and to preserve a discrete version of the constraint. The schemes are based on reformulating standard edge centered finite volume fluxes in terms of vertex centered potentials. Several numerical tests are presented.