Application of FCT to Incompressible Flows JUNHUI LIU, DAVID
MOTT, CAROLYN KAPLAN, ELAINE ORAN, Laboratory for Computational
Physics and Fluid Dynamics, Naval Research Laboratory — Flux-corrected trans-
port, FCT, has been applied to incompressible flows on a collocated grid. LCPFCT,
a standard version of FCT, has been used to calculate the advection term in the
momentum equation. The flux limiter embedded in the FCT algorithm helps to
stabilize oscillations introduced by the discretization of the advection term. It is
found that if the pressure-gradient term is included in the computation of interme-
diate velocities, the discretization of the pressure gradient term introduces odd-even
decoupling to the discretization of the Poisson equation, and results in pressure oscil-
lations. Therefore, to avoid this odd-even decoupling problem, the pressure gradient
term is either not included in the calculation of the intermediate velocities, or is
removed from the intermediate velocities after the integration of the momentum
equations. This extension of the FCT algorithm to incompressible flow provides us
with a time accurate and robust approach. It gives satisfactory results to a variety
of problems over a wide range of velocity and Reynolds number.

Junhui Liu
Laboratory for Computational Physics and Fluid Dynamics
Naval Research Laboratory

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