Mathematics > Numerical Analysis

Stability of ADI schemes for multidimensional diffusion equations with mixed derivative terms

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In this paper the unconditional stability of four well-known ADI schemes is analyzed in the application to time-dependent multidimensional diffusion equations with mixed derivative terms. Necessary and sufficient conditions on the parameter theta of each scheme are obtained that take into account the actual size of the mixed derivative coefficients. Our results generalize results obtained previously by Craig & Sneyd (1988) and In 't Hout & Welfert (2009). Numerical experiments are presented illustrating our main theorems.

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