

Generally, it's a good first draft. Here's my (quick) notes:

Abstract:

Be very careful of what you say in the abstract and introduction -- you can instantly lose a lot of readers if they see something that's not true.

Are steady CFD solvers marching in time?

Careful: are explicit solvers always inefficient?

You may wish to start the abstract by talking about high-accuracy differencing schemes, and focus it on extending traditional implicit methods for use with these large-stencil schemes, while trying to avoid the LHS costs associated with the additional diagonals from these methods....

In the nomenclature: remove TriDi, and do a 'find-and-replace' in the paper to use tridiagonal matrix where needed.

Introduction:

Careful: we usually choose to time march, but it's not required.

It looks like you need at least a sentence talking about the time steps of interest between the first two paragraphs; you may wish to talk about unsteady (two steps of interest) first and then steady.

Again, it looks like there's a need for another sentence before 'Explicit time marching is..'. You may wish to note that the governing equations are used to relate the spatial variation of the flow to the temporal variation (rephrase as you wish, being careful to include finite-volume (spatial integration) methods in this development).

'from one grid point (the': 'from one grid point to the next (the'

A quick definition of A- and L- stable schemes may be in order. Actually, since you use 'unconditionally stable' often in this paper, you may wish to replace A- and L-stable with 'unconditionally stable'.

You're jumping from topic to topic in the Introduction -- this is where you need to spend some time polishing. Remember that the reader does not necessarily know much about time marching schemes (particularly the reader who is looking at the abstract, introduction, and conclusions to quickly decide whether to read the paper) -- you don't want to lose them here.

ADI: 'during the past decade'? I don't think ADI has had much use since unstructured approaches took hold in the 1990s (but perhaps I'm wrong; I really haven't looked too hard).

Yoon and Jameson derived...: flux splitting is not a requirement for Newton iteration (ADI does not).

'... due to the high number of diagonals': in the LHS matrix.

'... marginal stability near computational boundaries': this is true, but is it a factor in this approach?

You may wish to drop ADI and ODI in favor of 'tridiagonal matrix', with a note in the Introduction and Conclusions that a stable method using tridiagonal matrices allows an ADI approach to be employed with a higher-dimensional problem.

-----skimming through the data-----

Before Eq. (5): note that you're linearizing the equation here (there are higher order flux Jacobians in reality).

Eq. (8): The d/dx includes the ΔQ term; it's not just dA/dx .

I'm interested: what is the restriction on the ADI time step in 3D? It was my impression that ADI has neutral stability in 3D (but, again, I haven't gone through the math).

IV: 'This chapter' should be 'This section is divided into two parts'

Thomas algorithm: 'simplified/cheap' == 'computationally efficient'

Figure 3: Since the eigenvalues are complex, why not plot them on a real/imaginary graph with the unit circle showing the stability bound? That way, you don't have to explain what 'grid index' is.

The test cases you're doing aren't actually the benchmark problems (since the benchmark problems are unsteady). I'd suggest putting more data in:

1) mean flow, with residual vs. iteration for the two cases and two schemes.

2) Demonstrate the unsteady solutions, using the DRP or RDRP scheme, reporting the physical and iterative CFLs used, to show the unsteady applications. You may wish to show the same calculation with the E2 scheme to highlight why you're using high-order schemes.

Conclusion:

I'm going to pretend that I didn't see the phrase 'numerical solution agrees with the exact'. Did you get exactly the analytic solution? It may 'agree well' -- but it doesn't 'agree'. (pet peeve of mine; can you tell?)