## Spectral discretization in space and time

## Einar M. Rønquist email: ronquist@math.ntnu.no

## February 13, 2003

## Abstract

High order discretization methods are most often used in order to approximate the spatial operators in a partial differential equation; very high order in time are almost never used in practice. There are several reasons for this. One reason is the fact that, for implicit methods in time, the resulting systems to be solved becomes prohibitively expensive to solve. However, in some special cases, it is interesting to discover that it is possible to construct direct solution algorithms for the fully discrete system which are also very fast. To my knowledge, this work is new, and I will discuss some of the main ideas. I expect the content may have a quite strong numerical "flavor."