In this graduate course we shall together read a number of journal articles with great impact in numerical analysis. A similar course was first given by Nick Trefethen at Cornell University in 1993, and has been given on several occations at TDB in Uppsala and at NADA at KTH since 1996.

For each article there will be a group consisting of three students. One student will act as the *group leader* (denoted "$\diamond$" in Table 1) and the other two students will act as *workers* (denoted "$\star$" in Table 1). Each group will make a 40 minutes presentation of the chosen article (preferable using power point or similar program). Each work/presentation follow the structure below:

1. All group members work together on the presentation, but the group leader is in charge of the work and is responsible for the presentation. The group leader is also responsible for the historical background to the article and the information about the author(s) (that should be included in the presentation). The group leader will not participate in the implementation of the numerical experiments (see below).
2. The two workers are responsible for providing an overview of the scientific contents (targeting the math and numerical analysis) without going into too much detail (that should be included in the presentation). The two workers are also responsible for performing relevant numerical experiments (that should be included in the presentation).

The presentation of an article is ended by a discussion (10-15 minutes). All participating students act once as group leader and twice as workers, see Table 1.

The course gives 7.5 credit points to everyone who actively participates in the presentations and the discussions and is present at all meetings. We meet four times (9/4, 29/4, 21/5 and 11/6) in room 2414b. All four meetings will include 3 articles. The time of the meetings (except 29/4) will be 9.00-12.20, with a coffee break 10.00-10.20. On 29/4 we meet between 13-16.15, with a coffee break 15.00-15.15.

Student/Article	1	2	3	4	5	6	7	8	9	10	11	12
Siyang	$\diamond$							$\star$				$\star$
Afshin	$\star$				$\diamond$							$\star$
Ahmad	$\star$				$\star$				$\diamond$			
Fredrik		$\diamond$			$\star$				$\star$			
Josefin		$\star$				$\diamond$			$\star$			
Jonatan		$\star$				$\star$				$\diamond$		
Saleh			$\diamond$			$\star$				$\star$		
Slobodan			$\star$				$\diamond$			$\star$		
Hanna			$\star$				$\star$				$\diamond$	
Martin				$\diamond$			$\star$				$\star$	
Simon				$\star$				$\diamond$			$\star$	
Gong				$\star$				$\star$				$\diamond$
Date $\left(\frac{Day}{Month}\right)$	$\frac{9}{4}$	$\frac{9}{4}$	$\frac{9}{4}$	$\frac{29}{4}$	$\frac{29}{4}$	$\frac{29}{4}$	$\frac{21}{5}$	$\frac{21}{5}$	$\frac{21}{5}$	$\frac{11}{6}$	$\frac{11}{6}$	$\frac{11}{6}$

Table 1: Schematic of the chosen articles and the participating students.

List of Articles

1. Brandt A. : Multi-level adaptive solutions to boundary value problems. Math. Comp. 31, 333–390, (1977).

2. Carpenter M. H. and Gottlieb D. and Abarbanel S. : Time–stable boundary conditions for finite–difference schemes solving hyperbolic systems: Methodology and application to high-order compact schemes. J. Comput. Phys. 111, 220–236, (1994).

3. Cooley J. W. and Tukey J. W. : An algorithm for the machine calculation of complex Fourier series. Math. Comp. 19, 297–301,(1965).

4. Courant, R. and Friedrichs, K. and Lewy, H. : On the Partial Difference Equations of Mathematical Physics. IBM J. Res. Dev. 11, 215–234, (1967).

5. Dahlquist G. : A special stability problem for linear multistep methods. BIT 3, 27–43,(1963).

6. Engquist B. and Majda A. : Absorbing boundary conditions for the numerical simulation of waves. Math. Comp. 31, 629–651, (1977).

7. Greengard L. and Rokhlin V. : A fast algorithm for particle simulations. J. Comput. Phys. 73, 325–348, (1987).

8. Hestenes M.R. and Stiefel E.L. : Methods of conjugate gradients for solving linear systems. J. Res. Nat. Bur. Stand., Sect B, 49, 409–436, (1952).

9. Kreiss, H.-O. and Oliger, J. : Comparison of accurate methods for the integration of hyperbolic equations. Tellus 24, 199–215, (1972).

10. Lax P.D. and Richtmyer R.D. : Survey of the stability of linear finite difference equations. Comm. Pure Appl. Math. IX, 267–293, (1956).

11. Osher, S. and Sethian, J. A. : Fronts propagating with curvature dependent speed: algorithms based on Hamilton–Jacobi Formulations, J. Comput. Phys. 79, 12–49, (1988).

12. Eriksson, K. and Johnson C. : An adaptive finite element method for linear elliptic problems, Math. Comp. 50, 361–383, (1988).