due Thurs. 11/9/06

228A HW6 Wilkening Fall '06

1-3. Compute the stability function $R(z)$ for each of the following methods and determine which are A-stable, L-stable.

SDIRK:

γ	γ
$1-\gamma$	$1-2\gamma$ $\quad \gamma$
	$1/2 \quad 1/2$

$\gamma = 1 \pm \frac{\sqrt{2}}{2}, \quad \frac{3 \pm \sqrt{3}}{6}$

Radau IIa

$1/3$	$5/12 \quad -1/12$
1	$3/4 \quad 1/4$
	$3/4 \quad 1/4$

Hammer-Hollingsworth

$\frac{1}{2}-\frac{\sqrt{3}}{6}$	$\frac{1}{4} \quad \frac{1}{4}-\frac{\sqrt{3}}{6}$
$\frac{1}{2}+\frac{\sqrt{3}}{6}$	$\frac{1}{4}+\frac{\sqrt{3}}{6} \quad \frac{1}{4}$
	$1/2 \quad 1/2$

4-6. Solve $y' = \lambda(y - \sin t) + \cos t$, $y(0) = 0$ for $0 \le t \le 1$ with $h = \frac{1}{N}$, $\lambda = -N^2$ for 3 values of N using each of the methods above and determine the rate at which the numerical solution is converging to the exact solution as $h \to 0$ (and $\lambda = -\frac{1}{h^2} \to \infty$).