

Hw6

Saturday, October 14, 2017 3:13 PM

- I1. improper , bounds are infinite
- I2. proper
- I3. improper , discontinuity with range $[-\infty, \infty]$
- I4. proper
- I5. improper, for x close to 1, the rectangle have height on infinite.
- I6. improper ∞ bound.
- I7. improper at $x=0$.
- I8. proper

6.2

$I(\alpha)$ is improper when $\alpha = 1/x$, $0 < x \leq 1$

Proper when $\alpha \neq 1/x$

$I(\beta)$ is improper when $\beta = 1/\sqrt{x}$

Proper everywhere when $\beta \neq 1/\sqrt{x}$

$I(\beta)$ is always proper when β is negative because the denominator is always positive.

6.3 compute the integrals

Trapezoid rule:

2 : 1.62526

4 : 1.54326

6 : 1.52732

8 : 1.52166

10 : 1.51903

12 : 1.5176

14 : 1.51674

16 : 1.51617

18 : 1.51579

20 : 1.51551

22 : 1.51531

Midpoint rule:

2 : 1.46126

4 : 1.50007

6 : 1.50788

8 : 1.51068

10 : 1.51199

12 : 1.5127

14 : 1.51314

16 : 1.51342

18 : 1.51361

20 : 1.51375

22 : 1.51385

Simpson rule:

2 : 1.52894

4 : 1.51593

6 : 1.51471

8 : 1.51447

10 : 1.51439

12 : 1.51436

14 : 1.51435

16 : 1.51434

18 : 1.51434

20 : 1.51434

22 : 1.51434

Taking the average of the 3 approximations.

$(1.51531 + 1.51385 + 1.51434)/3 = 1.5145$

6.4 Simpsons rule

Simpson rule with gamma factor:

-1 , 1.#INF

-0.9 , 1.74506

-0.8 , 1.59616

-0.7 , 1.50936
 -0.6 , 1.45099
 -0.5 , 1.40955
 -0.4 , 1.37966
 -0.3 , 1.35844
 -0.2 , 1.34421
 -0.1 , 1.33601
 -1.38778e-016 , 1.33333 (a decimal with 16 zeros is very close to 0)
 0.1 , 1.33601
 0.2 , 1.34421
 0.3 , 1.35844
 0.4 , 1.37966
 0.5 , 1.40955
 0.6 , 1.45099
 0.7 , 1.50936
 0.8 , 1.59616
 0.9 , 1.74506
 1 , 3.16354e+006

$I(x)$

