Math 128a – Week 10 Worksheet
GSI: Izak, (3/31/21)

4.9 Problems

Problem 1. *Use Composite Simpson's rule and the given value of* n *to approximate the following improper integrals:*

1. $\int_0^1 x^{-1/4}\sin(x)dx$, $n = 4$
2. $\int_0^1 \frac{e^{2x}}{x^{2/5}}dx$, $n = 6$

Problem 2. *Use the transformation* $t = x^{-1}$ *and the composite Simpson's rule for* $n = 4$ *to compute:*

$$\int_1^{\infty} \frac{1}{x^2+9}dx$$

5.1 Problems

Problem 3. *Use Theorem 5.4 to show that the following initial-value problems have a unique solution, and find the solution:*

1. $y' = y\cos(t)$, $0 \le t \le 1$, $y(0) = 1$
2. $y' = -\frac{2}{t}y + t^2e^t$, $1 \le t \le 2$, $y(1) = \sqrt{2}e$

Problem 4. *Show that the given equation implicitly defines a solution. Approximate* $y(2)$ *using Newton's method:*

$$y' = -\frac{y^3+y}{(3y^2+1)t}$$

for $1 \le t \le 2$, $y(1) = 1$. $y^3t + yt = 2$