

Analysis Lab 8

Topic: Understanding the Limit Superior and the Limit Inferior

Guidelines for Lab Report

For this lab, submit a report according to guidelines given below.

1. For Section 2, submit your answers to Questions 1-9. The tables for Questions 1 and 2 are provided on the next page.
2. For Section 3, submit your answers to Questions 1-9. The tables for Questions 1 and 2 are provided on page 4.
3. For Section 4, submit your answers to Questions 1-6. The table for Question 1 is provided on page 6.
4. Complete the Questions for Reflection as assigned by your instructor. Write your response to each question on a separate sheet(s), and attach to the rest of this report.

2 The Construction for Limit Superior

1.

Sequence	v_1	v_{10}	v_{100}	v_{1000}
$(1/n)_{n=1}^{\infty}$				
$(\cos(n\pi/2))_{n=1}^{\infty}$				
$(2 + ((-1)^n/n))_{n=1}^{\infty}$				
$((n+1)/n)_{n=1}^{\infty}$				
$\left(\begin{cases} 3 - e^{-n} & \text{if } n \text{ is even,} \\ 3 & \text{if } n \text{ is odd} \end{cases} \right)_{n=1}^{\infty}$				

2.

Sequence	Formula for v_k	$\limsup(a_n) = \lim_{k \rightarrow \infty} v_k$
$(1/n)_{n=1}^{\infty}$		
$(\cos(n\pi/2))_{n=1}^{\infty}$		
$(2 + ((-1)^n/n))_{n=1}^{\infty}$		
$((n+1)/n)_{n=1}^{\infty}$		
$\left(\begin{cases} 3 - e^{-n} & \text{if } n \text{ is even,} \\ 3 & \text{if } n \text{ is odd} \end{cases} \right)_{n=1}^{\infty}$		

In the space provided, write answers to Questions 3-9. Attach additional sheet(s), if necessary.

3 The Construction for Limit Inferior

1.

Sequence	u_1	u_{10}	u_{100}	u_{1000}
$(1/n)_{n=1}^{\infty}$				
$(\cos(n\pi/2))_{n=1}^{\infty}$				
$(2 + ((-1)^n/n))_{n=1}^{\infty}$				
$((n+1)/n)_{n=1}^{\infty}$				
$\left(\begin{cases} 3 - e^{-n} & \text{if } n \text{ is even,} \\ 3 & \text{if } n \text{ is odd} \end{cases} \right)_{n=1}^{\infty}$				

2.

Sequence	Formula for u_k	$\liminf(a_n) = \lim_{k \rightarrow \infty} u_k$
$(1/n)_{n=1}^{\infty}$		
$(\cos(n\pi/2))_{n=1}^{\infty}$		
$(2 + ((-1)^n/n))_{n=1}^{\infty}$		
$((n+1)/n)_{n=1}^{\infty}$		
$\left(\begin{cases} 3 - e^{-n} & \text{if } n \text{ is even,} \\ 3 & \text{if } n \text{ is odd} \end{cases} \right)_{n=1}^{\infty}$		

In the space provided, write answers to Questions 3-9. Attach additional sheet(s), if necessary.

4 Critical Thinking Questions

1.

sequence = $(a_n)_{n=1}^{\infty}$	$\liminf(a_n)$	$\lim_{n \rightarrow \infty} a_n$	$\limsup(a_n)$
$(1/n)_{n=1}^{\infty}$			
$(\cos(n\pi/2))_{n=1}^{\infty}$			
$(2 + ((-1)^n/n))_{n=1}^{\infty}$			
$((n+1)/n)_{n=1}^{\infty}$			
$\left(\begin{cases} 3 - e^{-n} & \text{if } n \text{ is even,} \\ 3 & \text{if } n \text{ is odd} \end{cases} \right)_{n=1}^{\infty}$			

In the space provided, write your answers to Questions 2-6. Attach additional sheet(s), if necessary.