

# MT220: Complex Variables and Transforms

## Section: A,B (Fall 2021)

# A 04

[Total maks 60]

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**Topic:**  
**Fourier  
series**

**Launch:**  
Wed, Dec 01 '21

**Submit Date:**  
Sun, Dec 5 '21

**CLO-06**

### Submit on GCR by Submit Date – Late Assignments not accepted

<b>Submitted by:</b>	<b>Roll #:</b>	<b>Section:</b>
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1. This is a graded assignment; students are advised to revise all concepts before attempting.
2. Submit a **single PDF** in **GCR** by the submit date mentioned in GCR; SLATE/email not accepted.
3. Any pics or images used in the PDF must be scanned with **ClearScanner** app.
4. **Do not use** CamScanner or MS Lens as it deteriorates the image quality and the writing at the back of the page is also visible.
5. Submitting individual pictures or attaching multiple files **not accepted**.
6. **Late submission not accepted**.
7. Be sure to fill and checkmark the agreement in the submission box. **If not filled or checked, submission not accepted**.

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1. Collaboration is permitted with limitations as defined below.
2. All collaboration to be strictly done on GCR -> Assignment Collaboration Channel. May not post/discuss on any other forum.
3. Permitted forms of collaboration include (but not limited to) asking questions, answering questions, explaining intent of the question, explaining concepts, highlighting methods, discussion of all types, etc.
4. Forbidden forms of collaboration include (but not limited to) uploading solutions or partial solutions, letting know the partial or final answers, etc.

**This Channel will be monitored continuously. Anyone indulging in forbidden activities will be removed from the channel, their posts deleted, and zero marks assigned in the assignment.**

**Assignment Problem:**

1. Find the Fourier series representation of the function with period equals to  $1/50$  given by [10]

$$f(t) = \begin{cases} 1 & \text{if } 0 < t < 0.01 \\ 0 & \text{if } 0.01 < t < 0.02 \end{cases}.$$

2. Find the Fourier series representation of [10]

$$f(t) = 1 + t \quad \text{if } -\pi < t < \pi, \quad f(t + 2\pi) = f(t).$$

3. Find the Fourier series of the function with period  $2\pi$  defined by [10]

$$f(t) = t^2 \quad \text{if } 0 < t < 2\pi.$$

4. By defining an appropriate extension of the function [10]

$$f(t) = t \quad \text{if } 0 < t < \pi, \quad f(t + 2\pi) = f(t).$$

Find the half-range cosine series representation and Fourier series.

5. Obtain the Fourier cosine series with period  $2\pi$  for the function [10]

$$f(t) = \begin{cases} t & \text{if } 0 < t < \frac{\pi}{2} \\ \frac{\pi}{2} & \text{if } \frac{\pi}{2} < t < \pi \end{cases}.$$

6. Determine if the function is even, odd or neither. Hence obtain its Fourier series. [10]

$$f(t) = \begin{cases} \sin 2t & \text{if } -\pi < t < -\frac{\pi}{2} \\ 0 & \text{if } -\frac{\pi}{2} < t < \frac{\pi}{2}, \quad f(t + 2\pi) = f(t) \\ \sin 2t & \text{if } \frac{\pi}{2} < t < \pi \end{cases}.$$