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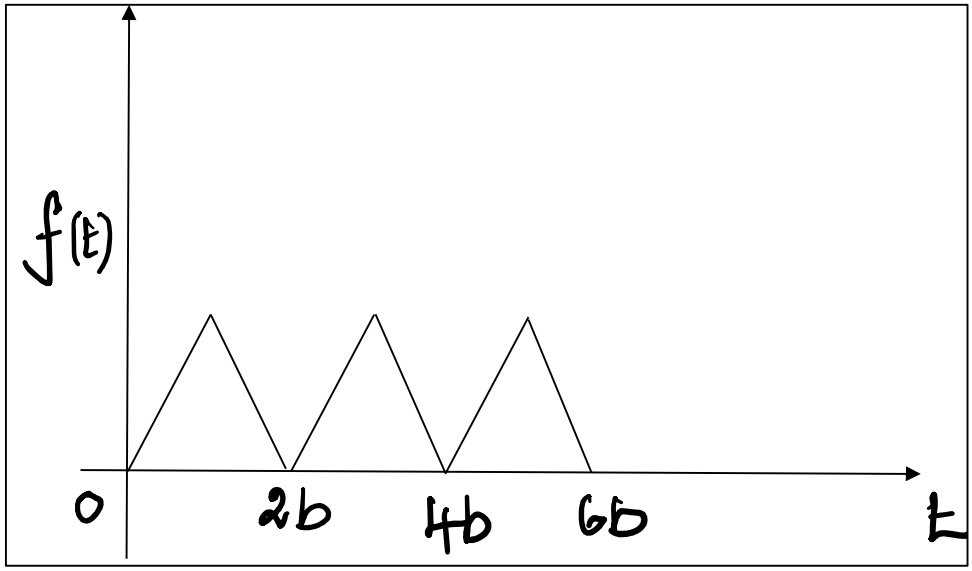
WINTER SEMESTER 2021-2022

BMAT102L_Differential Equations and Transforms

Module:3 Laplace Transform

TUTORIAL SHEET – I

1. Find the Laplace transform of the triangular wave function given below:



2. Find the Laplace transform of **(i)** $\left[\sqrt[3]{t^2}-\frac{1}{3\sqrt{t}}\right]^2$ **(ii)** $f(t)=\begin{cases}\cos t, 0<t<2\pi\\ 0, t>2\pi\end{cases}$

3. Find $L[f(t)]$ if $\begin{cases}t^2, 0<t<2\\ t-1, 2<t<3\\ 7, t>3\end{cases}$

4. (i) Find $L[f(t)]$ if $f(t)=\begin{cases}(t-2)^2, & t>2\\ 0, & 0<t<2\end{cases}$

(ii) If $L[f(t)]=\frac{s^3-s+1}{(3s+1)^2(s-2)}$ find $L[f(3t)]$.

5. Find $L[(t^2 - 3t + 2)\sin 3t]$

6. Find $L\left[\frac{e^{-4t}\sin 6}{t}\right]$

7. Find $L[e^{-t}\int_0^t t^2 \cos t\, dt]$

8. Find $L[e^{2t}\sin t \cos 2t]$

9. Find the Laplace transform of $\left[\frac{1-\cos t}{t}\right]$. Hence or otherwise find $L\left[\frac{1-\cos}{t^2}\right]$.

10. Find the Laplace transform of

(i) $3t^4 - 2t^{3/2} + 6$

(ii) $f(t) = \begin{cases} \cos t\,, 0 < t < \pi \\ sint, \quad t > 2\pi \end{cases}$