**DAILY ASSESSMENT 7**

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| **Date:** | 25-05-2020 | **Name:** | Sheela Golasangi |
| **Course:** | Digital Signal Processing | **USN:** | 4AL16EC068 |
| **Topic:** | Introduction to Fourier Series & Fourier Transform, Hilbert Transform, Complex FS, FS using Matlab and python, FS and Gibbs Phenomena using Matlab. | **Semester & Section:** | VIII  ‘B’ |
| **Github Repository:** | Sheela Golasangi |  |  |

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| **FORENOON SESSION DETAILS** |
| **Image of the session**  **C:\Users\india\Pictures\Screenshots\Screenshot (345).pngC:\Users\india\Pictures\Screenshots\Screenshot (348).png** |
| **REPORT**  **Fourier Analysis: Overview**  In mathematics, Fourier analysisis the study of the way general functions may be represented or approximated by sums of simpler trigonometric functions. Fourier analysis grew from the study of Fourier Series (FS), and is named after Joseph Fourier, who showed that representing a function as a sum of trigonometric functions greatly simplifies the study of heat transfer.  Today, the subject of Fourier analysis encompasses a vast spectrum of mathematics. In the sciences and engineering, the process of decomposing a function into oscillatory components is often called Fourier analysis, while the operation of rebuilding the function from these pieces is known as Fourier synthesis. For example, determining what component frequencies are present in a musical note would involve computing the Fourier Transform (FT) of a sampled musical note. One could then re-synthesize the same sound by including the frequency components as revealed in the Fourier analysis. In mathematics, the term Fourier analysis often refers to the study of both operations. FT is another coordinate transform that is particularly used for representing data, image, mathematical terms and different FT, etc.  ut =  Used for all kinds of representing the image compression and differential equations. And SVD= Data\_driven FFT here Hilbert spaces also used. The FFT compress the audio and signals and all digital communication build in FFT.  **Introduction to Fourier Series and Fourier Transform**  **Fourier Series:** In mathematics, infinite series are very important. They are used extensively in calculators and computers for evaluating values of many functions.  The Fourier Series (FS) is really interesting, as it uses many of the mathematical techniques that you have learned before, like graphs, integration, differentiation, summation notation, trigonometry, etc. It is used for approximation FS is having the 20-20000Hz is the range of human hearing. Formula of FS is  where the Fourier coefficients a0, an, and bn are defined by the integrals  a0=1/π∫π-π f(x) dx, ak=1/π∫π−π f(x) coskx dx, bk=1/∫π−π f(x) sinkx dx.  **Fourier Transform:** The Fourier Transform (FT) is a mathematical technique that transforms a function of time, x(t), to a function of frequency, X(ω). It is closely related to the Fourier Series. Formula of FT is  X(F) =  **Discrete Fourier Transform:** DFT deals with representing x*n* with samples of its spectrum Xω. Hence, this mathematical tool carries much importance computationally in convenient representation. Both, periodic and non-periodic sequences can be processed through this tool. The periodic sequences need to be sampled by extending the period to infinity.  The continuous DFT is…  X(F) =  Discrete DFT is…  X(k) =  **Complex Fourier Series:**  f(x) =  Further he explained about the FS using matlab, python codes and also gibbs phenomena of the matlab. |