**DAILY ASSESSMENT FORMAT**

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| **Date:** | **27-05-2020** | **Name:** | **Kiran N** |
| **Course:** | **DSP** | **USN:** | **4al16ec031** |
| **Topic:** | **1.Intuition of Fourier Transform and Laplace Transform**  **2.Laplace Transform of First**  **order**  **3.Implementation of Laplace**  **Transform using Matlab**  **4.Applications of Z Transform**  **5.Find the Z Transform of sequence using Matlab** | **Semester & Section:** | **8th and A** |
| **Github Repository:** | **Kiran-course** |  |  |

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| **FORENOON SESSION DETAILS** |
| **Image of session** |
| **REPORT**  An Introduction to Laplace Transforms and Fourier Series will be useful for second and third year undergraduate students in engineering, physics or mathematics, as well as for graduates in any discipline such as financial mathematics, econometrics and biological modelling requiring techniques for solving initial value One main point of the Fourier transform is that it exchanges differentiation and multiplication by t, under suitable hypotheses f ^’(x) = ix ˆf(x).  We saw an application of this when we computed the Fourier transform of e−t 2/2.  In principle one can use this to solve differential equations, as we saw in Example 9. However this does not work so well in many cases, mainly because the functions that solve our equations do not fulfil our suitable hypotheses’. If for example we try to solve a very simple equation f’= for even f’=0 we get only f = 0 as solutions. This is because the solutions to these equations, f = cet and f = c, are not in L1 so they have no Fourier transforms. The La place transform is a way around this difficulty. It operates on functions defined only on the interval [0,∞), that do not grow faster than exponentially.  Definition 2. Let f(t) be a function defined on [0,∞) which satisfies an estimate|f(t)| ≤ AeBt for some  constants A and B. Then its Laplace transform is the function ̃f(s) = L(f)(s) = ∫f(t)e−st dt.  It is defined for complex numbers s such that Re s > B; then the integral in the definition is convergent.  First of all we note that the Laplace transform determines the function uniquely -if we know the Laplace tranform we can in principle compute the function  **APPLICATIONS OF Z-TRANSFORM**    In mathematics and signal processing, the Z-transform converts a discrete-time signal, which is a sequence of real or complex numbers, into a complex frequency-domain representation.  It can be considered as a discrete-time equivalent of the Laplace transform. This similarity is explored in the theory of time-scale calculus.  The basic idea now known as the Z-transform was known to Laplace, and it was re-introduced in 1947 by W. Hurewicz and others as a way to treat sampled-data control systems used with radar. It gives a tractable way to solve linear, constant-coefficient difference equations. It was later dubbed "the z-transform" by Ragazzini and Zadeh in the sampled-data control group at Columbia University in 1952.  The modified or advanced Z-transform was later developed and popularized by E. I. Jury. The idea contained within the Z-transform is also known in mathematical literature as the method  Of generating functions which can be traced back as early as 1730 when it was introduced by de Moivre in conjunction with probability theory.  From a mathematical view the Z-transform can also be viewed as a Laurent series where one views the sequence of numbers under consideration as the (Laurent) expansion of an analytic function.  The Z-transform can be defined as either a one-sided or two-sided transform.[8] Bilateral Z-transform The bilateral or two-sided Z-transform of a discrete-time signal {\display style x[n]}x[n] is the formal power series {\displaystyle X(z)}X(z) defined as Unilateral Z-transform Alternatively, in cases where {\ displaystyle x[n]}x[n] is defined only for {\ display style n\geq 0}n\ geq 0, the single -sided or unilateral Z- transform is defined as In signal processing, this definition can be used to evaluate the Z-transform of the unit impulse response of a discrete-time causal system. An important example of the unilateral Z-transform is the probability-generating function, where the component {\display style x[n]}x[n] is the probability that a discrete random variable takes the value {\display style n}n, and the function {\display style X(z)}X(z) is usually written as {\display style X(s)}X(s) in terms of {\display style s=z^{-1}}{\display style s=z^{-  1}}. The properties of Z-transforms (below) have useful interpretations in the context of pobability theory. |

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