Bilinear transformation engineering mathematics

I'm not robot!



Engineering Mathematics - I Semester - 1 By Dr N V Nagendram

UNIT – IV Laplace Transformations Class 1

Section I

Introduction

The knowledge of Laplace Transformations has in recent years became an essential part of Mathematical background required of engineers and scientists.

Mathematical background required of engineers and scientists.

This is because the transform methods provide an easy and effective means for the solution of many problems arising in engineering.

This subject originated from the operational methods applied by the English engineer Oliver Heaviside (1850 – 1925) to problems in electrical engineering.

Unfortunately, Heaviside's treatment was unsystematic and lacked rigour, which was placed on sound mathematical footing by Bromwich and carson during 1916 – 1917.

It was found that Heaviside's operational calculus is best introduced by means of a particular type of definite integrals called "Laplace Transforms".

The method of Laplace Transforms has the advantage of directly giving the solution of differential equations with given boundary values without the necessary of first finding the general solution and then evaluating from it the arbitrary constants.

Moreover, the ready tables of Laplace Transforms reduce the problems of solving differential equations to mere algebraic manipulation.

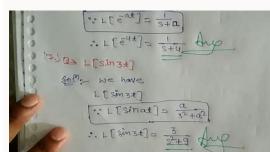
Definition: Integral transform

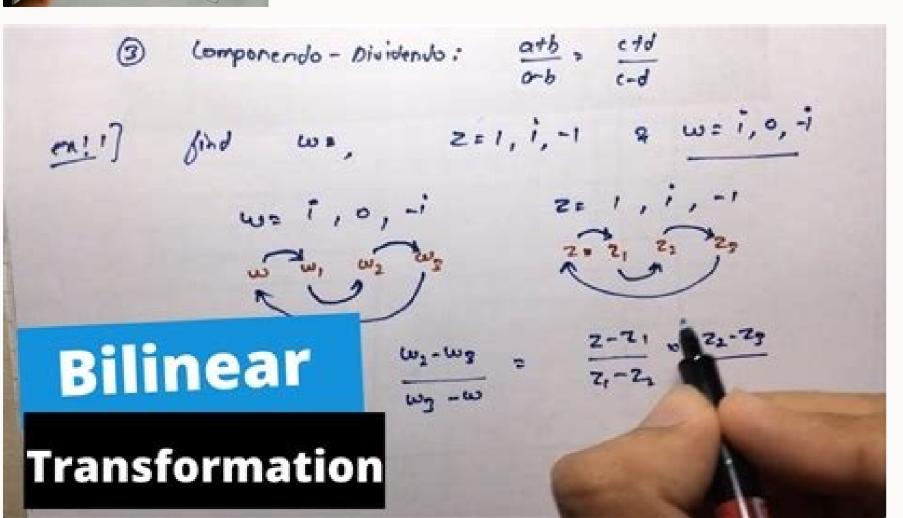
Let K(s, t) be a function of two variables s and t where s is a parameter [s \in R or C] independent of t. Then the function f(s) defined by an Integral which is convergent, i.e.,

 $f(s) = \int K(s, t) F(t) dt$ is called the Integral Transform of the function F(t) and is denoted by [T[F(t)], K(s, t) is kernel of the transformation.

If kernel K(s, t) is defined as
$$K(s,t) = \begin{bmatrix} 0, & \uparrow & t \in 0 & \text{or } \frac{1}{-} > 0 \\ t & \text{then} \end{bmatrix}$$







Bilinear transformation method. Example of bilinear transformation. Definition of bilinear transformation. Bilinear transformation formula.

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website. Thanks in advance for your time. Accept Decline Men know numbers-usually useless ones. I remember the score of the first test I took in fifth grade (59, open book), the number of home runs George Foster hit in 1977 (52, and I like Mike Schmidt), the miles my car has on it right now (173,482.6), and the points I scored during my eighthgrade basketball season (2). But when I need to recall the important numbers, the life-and-death digits, my brainpan turns into a colander. BMI, HDL, LDL, PSA, blood pressure, blood sugar, resting heart rate--I can't keep it all straight. So I asked the experts: Which numbers are essential to a man's health and as memorable as Heather Graham's measurements (36-28-34)Here they are: seven numbers that won't win you any bar bets, but can help you lose weight, prevent prostate cancer, and beat heart disease like Vince Ferragamo's career passing yardage (11,336) never could.24 Almonds. Eat them before dinner, and you'll lose weight. A Purdue University study showed that people who ate nuts high in monounsaturated fat, an ounce of almonds is enough to keep most guys from going ballistic at dinner, the time when they're most likely to overeat," says Elizabeth Ward, R.D., a nutritional consultant in Massachusetts. And odds are the weight you lose will stay off. Researchers found that of two groups of people who lost weight, those eating a diet high in monos were still slim after 18 months, while those going low-fat quickly porked up again. How to nail that number: Wash the nuts down with 8 ounces of water; this will keep you from eating more than 24 before their appetite-suppressing powers can kick in. "The fluid expands the fiber in the nuts to help you feel fuller," says Ward.7:30 Mile.Check your watch at the end of a mile run. If it shows 7 minutes, 30 seconds or less, you're at low risk of a heart attack, says Paul D. Thompson, M.D., director of preventive cardiology at Hartford Hospital, in Connecticut. "Poor exercise performance is one of the best predictors of heart-disease risk," says Dr. Thompson, who analyzed research from the Cooper Institute of Aerobics. "The faster you can run, the longer you'll live." And the greater stroke volume would probably mean you'd survive it," says Dr. Thompson. How to nail that number: Practice quarter-mile intervals. Run a little faster than your mile pace for a quarter of a mile, then walk for 3 minutes. Repeat seven more times. Do this twice a week. "Quarter-mile intervals are best because you're using a combination of speed and endurance, which makes you faster," says Dr. Thompson.3 days a week. That's how often you have to lift weights three times a week, their sensitivity to insulin improved by 23 percent, compared with no change in those training aerobically. Insulin sensitivity is key to helping your body process sugar (glucose). "Unlike endurance training, resistance training results in an increase in muscle may help increase glucose disposal," says Edward Horton, M.D., director of clinical research at the Joslin Diabetes Center in Boston. How to nail that number: Do the circuit-training program used in the Finnish research: Go to a gym and train the large muscle groups--back, abs, arms, and legs--by doing eight to 10 repetitions at each exercise station, resting for 30 seconds, and then moving on to the next station. Repeat two more times for a total of three sets.10 Minutes. Spend this amount of time icing after a run to save your knees from osteoarthritis. Weight-bearing exercises, such as running or playing basketball, draw blood and a lubricant called synovial fluid to you're exercising. But if extra synovial fluid and blood stick around too long, the cartilage can crack, and osteoarthritis will eventually develop. That's why post-exercise icing is so critical: "The ice makes the extra fluid run away from your joints, and then your lymphatic system filters it out," says Kevin Olds, C.S.C.S., M.S.P.T., a physical therapist in Memphis. How to nail that number: Keep a few instant cold packs in your gym bag. (Cramer cold packs are \$18 for a box of 16.) In a pinch, put a cold can of soda just below the kneecap, right on the patellar tendon, says Olds. "That's where the joint line is."8 Ounces of OI.Drink this much at breakfast, lunch, and dinner to prevent a stroke. Downing OI--the not-from-concentrate kind--daily is still the easiest way to boost your high-density lipoprotein (HDL) cholesterol and in turn lower your stroke risk. When Columbia University researchers measured the HDL levels of 1,444 people, they found that those with the highest levels had a significantly reduced risk of an ischemic stroke, the type that affects most men. "HDL cholesterol is the garbage trucks, they can remove all the trash." This includes the "trash" that causes impotence. How to nail that number: Make it easier to stomach. If the acidity of OJ is too much, try Tropicana Pure Premium Low Acid orange juice. Missed a glass? Snack on a Hershey's Special Dark chocolate bar (the regular, 1.45-ounce size), the amount of chocolate Pennsylvania State University researchers found increased HDL levels by 4 percent.6 Pullups.A fit man who weighs between 170 and 200 pounds should be able to do this many. (If you're lighter, it's 10. Heavier? Four.) "The pullup is the perfect exercise to gauge your strength because it forces you to lift your entire body," says Michael Mejia, C.S.C.S., exercise advisor to Men's Health. "Men who can do this many shouldn't really encounter too many situations that they can't physically accomplish." But six means six perfect pullups. Keep your hands shoulder-width apart, palms facing out, and legs together. When your chin completely clears the bar, pause for a count of two, then slowly lower yourself and repeat. How to nail that number: Place a bench under the bar and do negative pullups. Stand on the bench, grasp the bar, and then bend your legs so your feet hang free. Take 5 seconds to lower yourself until your arms are straight. Step back on the bench and repeat three more times. Do two to three sets twice a week. "These will develop your muscles enough so that you'll eventually be able to lift yourself," says Mejia. 2 Servings of fish. Put this on your weekly menu to help cancer-proof your prostate. Researchers at the Karolinska Institute in Stockholm studied the diets of 6,272 men and found that those who ate it regularly. The omega-3 fatty acids in fish help inhibit prostate-cancer growth, says Alicia Wolk, M.D., the study author. Tuna, salmon, and sardines are all swimming in omega-3s. How to nail that number: If Mrs. Paul's is your idea of deep-sea dining, take Coromega fish-oil supplements. You get a healthy dose of omega-3s--350 milligrams (mg) EPA and 230 mg DHA--in a ketchup-packetsized portion of orange-flavored cream. Watch Next Define bilinear transformation and prove that in a general a bilinear transformation maps into a circle. By Chron Contributor Updated February 09, 2021 Obtaining an engineering degree requires you to successfully complete a multitude of engineering mathematics courses. In the days before computers, engineers used slide rules and pencils to work out math problems, such as determining the stresses a dam must withstand, or the most efficient operating weight of an airplane. Although computers can solve many math problems, engineers still need a solid foundation in math and a good understanding of mathematical principles. Each university develops its own degree plan and course catalog, but certain types of engineering math courses are typically required. Requirements vary by university, but since a thorough understanding of algebra and trigonometry in college. At some schools, if you had high school algebra and trigonometry, you are deemed proficient enough to begin your math with calculus. Other schools look at your placement test scores or your math with calculus. Other schools look at your placement test scores or your math with calculus. requirements for an engineering degree. Most engineering degree, Most engineering degree plans require three semesters of calculus, or as a separate course, vou will also need to take analytic geometry. Analytic geometry, trigonometry to determine limits, vectors, integrals, mean values and derivatives. One of the more advanced math functions engineers must understand is differential equations. In addition to engineering geometry, trigonometry is one of the more usual maths for engineers. By applying the principle of trigonometry, engineers can calculate such data as the height of an existing structure, the measurement of an angle, or the distance between two points. In many ways, trig is similar to plane geometry in that it relies heavily on formulas and logarithms, rather than solving complex equations. Trigonometry and calculus, together, form the basis for another math-heavy class: engineering physics. Some universities separate probability and statistics into two separate courses, but other schools combine them. Probability teaches you how to calculate the odds of an event occurring, with random variables and the various theories on limits. Statistics covers sampling techniques, estimation, margin of error and other skills needed to analyze data. Depending on the engineering specialty and the university, engineers may take additional mathematics courses. For example, you might have to devote an entire class to vectors. Some universities offer engineering math courses that combine elements of multiple classes. Discrete mathematics uses the theory of sets, along with equations and graphs to describe algorithms and data.

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