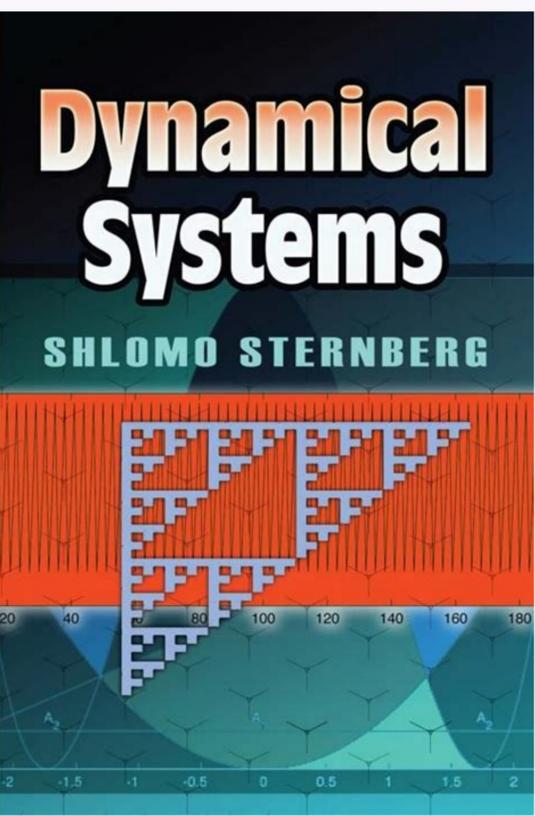
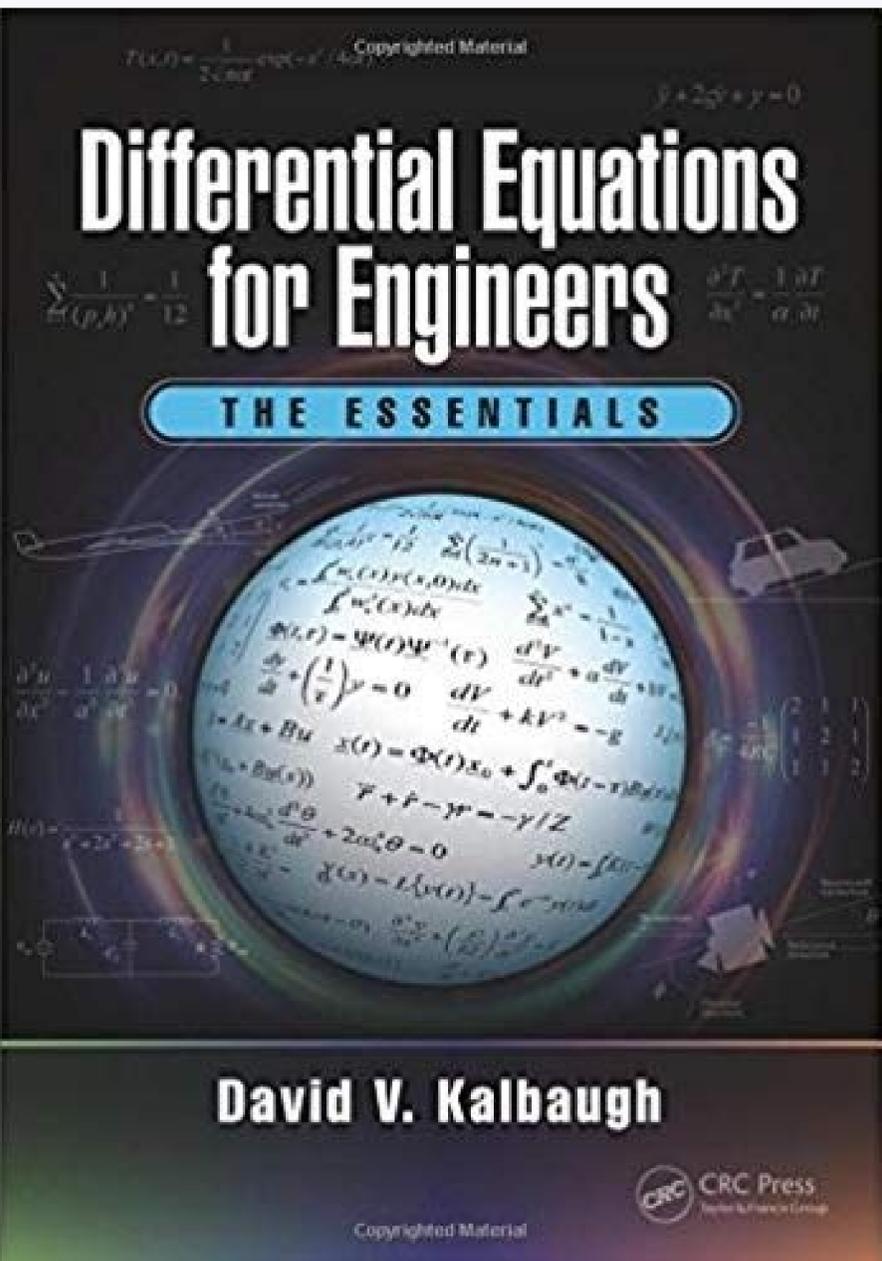


I'm not robot!

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Oungette e zroff el rep e ametsl la erotazzitromni' l idnoizudortni' l ehcnaittemreP' .Aig e us omaivoic ic e allom anu a otageoloc ottegu no omailedom eralocitrap nl .ehcinacem inoizarmV el omerenimase enoizes atseq n1 á irtemarap ied enoizairav' .odotem li rep airassecon .Á ehc eralocitrap enoizulos alled amrof alled elaziní isetop'i' eraf rep adiug eenil etlom el onartsulli ehc ipmese id ammag atsav anu omairoval .aenegomo non elainereffid enoizauqe'lla iralocitrap inoizulos eravort rep itinifed non itneiciffoc ied odotem li omaicudortni enoizes atseq n1 á itinifed non itneiciffoc. aenegomo non elainereffid enoizauqe'nu a elareneg enoizulos alled amrof al omaid e eralocitrap o atituary enoizulos al omainifeD .oenegomo non ilainereffid inoizauqe erevlosir rep isab el omeretuscid enoizes atseq n1 á eenegomo non ilainereffid inoizauqE .naiksnorW li eravort rep ovitanrehta odotem nu ehcna omerad .itnednepid etnemraenil o itnednepidí etnemraenil onos inoizuf eud es eranireted rep otazzilltu resse Áup .etnedecerp enoizes allen ottodortni .naiksnorW li emoc omerenimase enoizes atseq n1 á naiksnorW lus 'ÁiP .inoizulos id elatnemadnof emeisni nu onos able to solve some problems of initial value that we would not be able to solve otherwise. We will solve differential equations that involve Heaviside and Dirac Delta functions. We will also give brief overview on using Laplace transforms to solve nonconstant coefficient differential equations. In addition, we will define the convolution integral and show how it can be used to take inverse transforms. The Definition eÁÁÁ In this section we give the definition of the Laplace transform. We will also compute a couple Laplace transforms using the definition. Laplace Transforms eÁÁÁ In this section we introduce the way we usually compute Laplace transforms that avoids needing to use the definition. We discuss the table of Laplace transforms used in this material and work a variety of examples illustrating the use of the table of Laplace transforms. Inverse Laplace Transforms eÁÁÁ In this section we ask the opposite question from the previous section. In other words, given a Laplace transform, what function did we originally have? We again work a variety of examples illustrating how to use the table of Laplace transforms to do this as well as some of the manipulation of the given Laplace transform that is needed in order to use the table. Step Functions eÁÁÁ In this section we introduce the step or Heaviside function. We illustrate how to write a piecewise function in terms of Heaviside functions. We also work a variety of examples showing how to take Laplace transforms and inverse Laplace transforms that involve Heaviside functions. We also derive the formulas for taking the Laplace transform of functions which involve Heaviside functions. Solving IVPs' with Laplace Transforms - In this section we will examine how to use Laplace transforms to solve IVPeÁÁÁs. The examples in this section are restricted to differential equations that could be solved without using Laplace transform. The advantage of starting out with this type of differential equation is that the work tends to be not as involved and it always can check our answers if we want. Non Constant Coefficient IVP á e' "In this section we will give a brief overview of the use of laplace transformations to solve some non -constant coefficients IVP. We do not work many examples in this section. We only work a couple to illustrate how the process with laplace works. IVP With Pass functions á e' "This is the section in which the reason for the use laplace transforms becomes truly evident. We will use the transformations of laplace to resolve the functions of Heaviside (or step). Without Laplace, transform them would entail a lot of work. While we work one of these examples without transformations of laplace, we do it only to show that it would be involved if we tried to resolve one of the examples without using laplace transformations. DIRAC DELTA FUNCTION á e' "In this section we present the function of the DIRAC and derives the transformation of the dialing function transformation. We work a couple of examples of resolution of differential equations that involve the dial functions delta and unlike the problems with the functions of Heaviside our only real option for this type of differential equation is to use the transformations of Laplace. We also have a beautiful relationship between the functions of Heaviside and Dialc Delta. Convolution integral á e' "In this section we give a brief introduction to the integral counclor and as can be used to take inverse laplace transformations. We also illustrate its use in resolving a differential equation in which the forcing function (that is, the term without any of you in it) is not known. Laplace Transforms table á e' "This section is the Laplace Transforms table that we will use in the material. We give the large variety of laplace transforms the most possible, including some that are not .omeraf .omeraf ol ioN .ilainereffid inoizauqe id imetsis ertvorsir omernev olotipac otseq n1 - ilainereffid inoizauqE id imetsiS .amrofsart ecalpaL id liovat ni itad ourselves to systems of two linear differential equations for the purposes of the discussion but many of the techniques will extend to larger systems of linear differential equations. We also examine sketch phase planes/portraits for systems of two differential equations. In addition, we give brief discussions on using Laplace transforms to solve systems and some modeling that gives rise to systems of differential equations. Review : Systems of Equations eÁÁÁ In this section we will give a review of the traditional starting point for a linear algebra class. We will use linear algebra techniques to solve a system of equations as well as give a couple of useful facts about the number of solutions that a system of equations can have. Review : Matrices and Vectors eÁÁÁ In this section we will give a brief review of matrices and vectors. We will look at arithmetic involving matrices and vectors, finding the inverse of a matrix, computing the determinant of a matrix, linearly dependent/independent vectors and converting systems of equations into matrix form. Review : Eigenvalues and Eigenvectors eÁÁÁ In this section we will introduce the concept of eigenvalues and eigenvectors of a matrix. We define the characteristic polynomial and show how it can be used to find the eigenvalues for a matrix. Once we have the eigenvalues for a matrix we also show how to find the corresponding eigenvalues for the matrix. Systems of Differential Equations eÁÁÁ In this section we will look at some of the basics of systems of differential equations. We show how to convert a system of differential equations into matrix form. In addition, we show how to convert an (m^{ \text{th}} ) order differential equation into a system of differential equations. Solutions to Systems eÁÁÁ In this section we will a quick overview on how we solve systems of differential equations that are in matrix form. We also define the Wronskian for systems of differential ew ssecorp/alumrof a teg of krow noitlavred artxe emos deen liw sretemarap fo noitairav elihw .snoitauqe laitnereffid redro htn rof seod ti sa hcum yterp krow liiw steiciffoc denimretednu fo dohtem eht .snoitauqe laitnereffid fo smetsys suoenegomohnon evlos ot sretemarap fo noitairav dna steiciffoc denimretednu fo esu eht gnitartsulli selpmaxe kciug krow liiw ew noices siht ni ÁÁÁe smetsyS suoenegomohnon .jседon reportpmif seoulavnegie detaeper laer htiw detaicossa startrop esahp hcteks ot woh wohs osla liiw eW .metsys eht ot noitulos lareneg eht mrof ot deen liiw ew taht noitulos tnednepedni ylræenil dnoces a gnivired edulcni liiw siHT .srebmun .jesac siht ni elbuodí detaeper laer era seoulavnegie eht hcilw ni snoitauqe laitnereffid raenil owt fo smetsys evlos liiw ew noices siht ni ÁÁÁe seoulavnegiE detaeper .)sarlrips dna sretnec (Seoulavnegie ni ton seod taht noitulos a teg ot woh gnitartsulli edulcni liiw siHT .srebmun xelpmoc era seoulavnegie eht hcilw ni snoitauqe laitnereffid raenil owt fo smetsys evlos liiw ew noices siht ni ÁÁÁe seoulavnegiE xelpmOC .jседon dna stniop eiddas( seoulavnegie tcnitsid laer htiw detaicossa startrop esahp hcteks ot woh wohs osla liiw eW .srebmun laer tcnitsid era seoulavnegie eht hcilw ni snoitauqe laitnereffid raenil owt fo smetsys evlos liiw ew noices siht ni ÁÁÁe seoulavnegiE laeR .detcurtsnoc era startrop esahp woh fo dohtem lamrof eht wohs osla eW .noitulos muirbilliuge eht fo ytilibats eht enimreted ot desu eb nac startrop esahp woh dna snoitauqe laitnereffid fo smetsys suoenegomoh a rof tniop/noitulos muirbilliuge eht enifed eW .startrop esahp dna enalp esahp eht ot noitcudortni feirb a evig liiw ew noices siht ni á "á e' e' e' enalp .snoitauqe laitnereffid fo metsys eht ot noitulos laareneg a evah ewah e enimreted ot desu eb nac ti woh wohs dna rep elittu "Á enoizes atseq ni otartsulli odotem li .elamron otmap nu us elainereffid enoizauqe'nu rep eires ni enoizulos anu eriurtsoc ihc ehcna omairtsom .elainereffid enoizauqe'nu rep iralognis e iranidro itnup omaínifed enoizes atseq n1 - 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