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needed for the mathematical study of nonlinear problems arising from mathematical physics nonlinear wave equations and mechanics a particular emphasis will be made on the classical description of fundamental nonlinear waves discovered in the 19th century solitons or solitary waves nonlinear analysis begins with being able to recognize the factors contributing to structural nonlinearities and how to build models effectively to account for them this course serves as a starting point for anyone wishing to perform nonlinear structural analysis in any mechanical this course is a theory application to solve nonlinear and dynamic structural problems the student will learn how to define material geometrics contact and loadings non linearity this tutorial introduces you to the nonlinear structural analysis workbench the following tasks are discussed we will use hypermesh optistruct user profile to run this nonlinear static analysis the steps to implement follower loads large displacement analysis and material yielding are shown in this tutorial teaches how to set up and run a nonlinear structural analysis assign boundary conditions materials and other models to the simulation mesh the geometry with simscale s standard meshing algorithm explore the results using simscale s online post processor simsolid performs meshless structural analysis that works on full featured parts and assemblies is tolerant of geometric imperfections and runs in seconds to minutes in this tutorial you will do the following create structural nonlinear analysis material and contact nonlinear nonlinear structural behavior may be associated with either geometric or material response each described as follows geometric nonlinearity concerns the  $p$  delta effects associated with application of external loading upon the displaced configuration of a structure problems such as crash simulation analysis of airbag deployment or modeling a metal stamping process all require nonlinear dynamic analysis because both large deformations nonlinear geometry and large strains nonlinear material occur

- 1 geometrical nonlinear analysis
- 1 1 large displacements rotations and strains
- 1 2 non conservative loads
- 1 1 3 specific elements
- 1 2 physical nonlinear analysis
- 1 2 1 nonlinear elasticity
- 1 2 2 hyperelasticity
- 1 2 3 plasticity
- 1 3 nonlinear solution procedures

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