Ls in ansys full form

Recently, Ansys acquired Livermore Software Technology Corporation (LSTC), developer of the LS-DYNA tool. The ease of use of this tool together with other Ansys products allows you to integrate linear, nonlinear, implicit, and explicit simulations. With this, there are a number of benefits for engineers. We can cite as an example the use of Ansys Mechanical to study linear deformations that occur over large time intervals. LS-DYNA, on the other hand, can handle nonlinear deformations that occur in milliseconds. The combination of these studies has several applications in the automotive, aerospace, manufacturing, electronics and defense industries. LS-DYNA integration applications with Ansys tools such as LS-DYNA interface with Ansys Mechanical, Ansys SpaceClaim and Ansys Workbench, benefit from all pre- and post-processing tools in the software ecosystem. Another possibility is the parametric study with bidirectional CAD connectivity, configured to evaluate how changing geometry affects the impact performance of design variations. Simulating impacts and other nonlinear dynamics with LS-DYNA LS-DYNA is the most powerful and flexible general purpose explicit analysis code in the world. Its finite element structural analysis solver through the explicit method is used by the automotive, aerospace, construction, military, manufacturing and bioengineering industries, and can be loaded with forces generated by several other solvers, including computational fluidic (CFD), thermal, electromagnetic and particles. The explicit method is used to solve transient problems that involve large nonlinearities that occur in milliseconds. LS-DYNA applications span a wide range of industries, potential LS-DYNA applications are numerous and can be adapted to multiple fields or combined to model a wide range of physical events. Aerospace The LS-DYNA is widely used by the aerospace industry. Applications include: Containment of jet turbine blades Impacts with birds (windshield and turbine blade) Structural fault analysis Simulation of water impact of the Orion space capsule with icfd / LS-DYNA Bird impact on turbine blade Automotive resistance and occupant safety We also find many uses for LS-DYNA in the automotive industry when analyzing vehicle designs. The LS-DYNA accurately predicts the behavior of a car in a collision and the effects of collision on occupants. With LS-DYNA, automotive companies and their suppliers can test and optimize their virtual prototypes to pass project approval on the first physical certification test, saving time and expense. The LS-DYNA also has a library of elements to facilitate rapid numerical evaluation, such as: (reformers, pretensors) Airbag Airbag Accelerometer Sensors Models The LS-DYNA can create collision simulations and reduce the number of physical tests needed to certify a vehicle's safety engineering in seismic shocks – interaction of soil structure Civil structures, such as concrete dams, nuclear power plants, skyscrapers and bridges, are large enough for earthquake vibration to affect the movement of the base holding it , which holds it, which, in turn, transfers the movement of the structure itself. This interaction between structure and soil should be accurately modeled to design earthquake-resistant structures and properly assess the safety of existing structures. The LS-DYNA has a method for analyzing structure-to-floor interaction that efficiently and rationally applies seismic forces and accurately models unlimited dominance at low computational cost, given a free-field movement that characterizes an earthquake. Flexible cylinder affected by solitary wave metal (tsunami) modeling One of the most commonly used applications by LS-DYNA is the evaluation of sheet metal processes. LS-DYNA accurately predicts tension, deformation and failure trend in metals. LS-DYNA supports remeshing during analysis as needed to increase accuracy and save time. Metal applications include: Springback Hydroform Print Forge Springback Example Using LS-DYNA Multiphysics The LS-DYNA includes different solvers for multiphysical coupling, with a wide range of applications: compressible and incompressible CFD Electromagnetism Thermal Acoustic Coupling DEM-CFD in a rotation mechanism with the LS-DYNA LS-DYNA in LS-DYNA compressible CFD in electromagnetism Other applications include: Drop and impact test Container design Plastic glass mold containers , biomechanical shock molds and molds (heart valves) Metal cutting Fault analysis Detection Sports equipment (golf clubs, Golf balls, baseballs, baseballs, baseball stools, helmets) Civil engineering (offshore platforms, pavement design) Proof of falling a domestic stove Finite element geometry of an IBM 4U energy server ready to be tested against crashes by mechanical engineers by the University of Caxias do Sul (UCS) and postgraduate in Esss Numerical Structural Analysis. He has experience in finite elements and application engineering in the oil and gas sector. He is currently part of the technical team of Esss in the FEA. Ansys LS-DYNA is the most widely used explicit simulation program, capable of simulating the response of materials to short periods of severe load. Its numerous elements, contact formulations, material models and other controls can be used to simulate complex models with control over all the details of the problem. Ansys LS-DYNA a wide range of capabilities to simulate extreme deformation problems using its explicit solver. Engineers can tackle simulation simulations material failures and watch the fault progress through a part or through a system. Models with large numbers of parts or surfaces that interact with each other are also easily handled, and interactions and load that pass between complex behaviors are accurately modeled. Using computers with a higher number of CPU cores can dramatically reduce solution times. This article needs additional appointments for verification. Please help improve this article by adding quotes to reliable sources. Material without source can be challenged and removed. Find sources: LS-DYNA – News ? Newspapers? Books? Academic? JSTOR (April 2018) (Learn how and when to remove this template message) LS-DYNAScreenshot from LS-PrePost showing the results of an LS-DYNA simulation of a Geo Metro that affects a rigid wall at 120 kilometers per hour (75 mph)Developer(s)LSTC (Ansys, Inc.) Stable ReleaseR8.0 / March 2015 Operating SystemMicrosoft Windows, Linux, Unix[1]TypeComputer-aided engineering, Finite Element AnalysisLicenseProprietary commercial software (1978 DYNA3D Public domain software[2])Website LS-DYNA is an advanced general purpose multiphysical simulation software package developed by the former Livermore Software Technology Corporation (LSTC), which was acquired by Ansys in 2019. [3] While the package continues to contain increasing possibilities for calculating many complex real-world problems, its origins and core competence lie in the analysis of highly nonlinear transient dynamic finite elements (FEA) using explicit time integration. LS-DYNA is used by the automotive, aerospace, construction and civil engineering, military, manufacturing and bioengineering industries. LS-DYNA History originated from the 3D FEA DYNA3D program, developed by Dr. John O. Hallquist at Lawrence Livermore National Laboratory (LLNL) in 1976. [4] DYNA3D was created in order to simulate the impact of the full fusion option (FUFO) or Dial-a-yield nuclear bomb for low-altitude launch (impact speed of 40 m/s). At the time, no 3D software was available to simulate impact, and 2D software was inadequate. Although the FUFO pump was eventually cancelled, the development of DYNA3D continued. [2] DYNA3D used explicit time integration to study nonlinear dynamic problems, with the original applications being mainly stress analysis of structures subjected to various types of impacts. The program was initially very simple in large part due to the lack of adequate computational resources at the time. A two-dimensional version of the same software was developed simultaneously. [4] In 1978 the DYNA3D source code was released into the unrestricted public domain after a request from France. [2] In 1979 a new version of DYNA3D that was programmed for optimal performance on CRAY-1 supercomputers. This new version contained improved sliding interface treatment that was an order of magnitude faster than previous contact treatment. This version also removed deleted and higher-order solid elements of the first version, while including the integration of elements of the comprehensive difference method developed in 1974. [4] The 1982 release included nine additional material models that allowed for new simulations, such as explosive structure and soil structure interactions. The release also allowed the analysis of the structural response due to penetrating projectiles. Improvements in 1982 further increased execution speed by approximately 10 percent. Hallquist was the sole developer of DYNA3D until 1984, when he joined Dr. David J. Benson. [5] In 1986, many capabilities were added. Added features included beams, shells, rigid bodies, single-surface contact, interface friction, discrete springs and dampers, optional hourglass treatments, optional exact volume integration, and VAX/VMS operating system support, IBM, UNIX, COS. At this point, DYNA3D became the first code to have a single-surface general contact algorithm. [4] Metal formation simulation and composite analysis capabilities were added to DYNA3D in 1987. This version included changes in shell elements and dynamic relaxation. The final release of DYNA3D in 1988 included several more elements and capabilities. [4] By 1988 LLNL had sent approximately 600 tapes containing simulation software. Hallquist had consulted nearly 60 companies and organizations on the use of DYNA3D. [2] As a result, in late 1988 Livermore Software Technology Corporation (LSTC) was founded to continue the development of DYNA3D in a much more focused manner, resulting in LS-DYNA3D (later shortened to LS-DYNA). Therefore, versions and support for DYNA3D were stopped. Since then, LSTC has greatly expanded LS-DYNA's capabilities in an attempt to create a universal tool for most simulation needs. [4] In 2019, LSTC was acquired by Ansys, Inc.[3] Typical uses Means at least one (and sometimes all) of the following complications: Changing limit conditions (such as contact between parts that change over time) Large deformations (e.g. crumpling sheet metal parts) Nonlinear materials that do not exhibit ideally elastic behavior (e.g. thermoplastic polymers) Transient dynamics mean analyzing high-speed, short-lived events. Typical uses include: automotive accident (chassis deformation, airbag inflation, seat belt tension, ...) Explosions (underwater mines, loads in shape, ...) Manufacture (sheet metal stamping, ...) LS-DYNA features consists of a single executable file and is fully controlled by the command line. Therefore, all it takes to run LS-DYNA is a shell of executable, an input file, and enough free disk space to run the calculation. All input files are in simple ASCII format and can therefore be prepared using any text editor. Input files can also be prepared with the help of a graphical preprocessor. There are many third-party software products available for LS-DYNA LS-DYNA input preprocessing LSTC also develops its own preprocessor, LS-PrePost, which is freely distributed and runs un licensed. LS-DYNA licensees automatically have access to all program capabilities, from simple linear static mechanical analysis to advanced thermal and flow resolution methods. In addition, they have full use of LSTC LS-OPT software, an independent probabilistic design optimization and analysis package with an interface to LS-DYNA. Capabilities Potential LS-DYNA applications are numerous and can be adapted to many fields. LS-DYNA is not limited to any particular type of simulation. In a given simulation, any of the many features of LS-DYNA can be combined to model a wide variety of physical events. An example of a simulation involving a unique combination of features is NASA's JPL Mars Pathfinder landing that simulated the use of space probe airbags to assist in its landing. LS-DYNA Analysis Capabilities: Complete 2D and 3D Capabilities Nonlinear Dynamics Rigid Body Dynamics Quasi-ical Simulations Desilised Modes Thermal calculations Thermal analysis Fluid analysis Eulerian capabilities ALE (Arbitrary Lagrangian-Eulerian) FSI (Fluid-Structure Interaction) Navier-Stokes fluids Compressible fluid solver, EESC (Conservation Element & Solution Element) FEM Rigid Multibody Dynamics Coupling (MADYMO, Cal3D) Analysis of Underwater Shock Failures Real-Time Acoustic Real-Time Acoustic Real-Time Acoustic Real-Time Multiphysical Coupling Implicit Structural-Thermal Coupling Redo SPH (Smooth particle hydrodynamics) DEM (Discrete Elements Method) EFG (Element Free Galerkin) Em Radiation Transport (Electromagnetism) Complete library of LS-DYNA material models: Metals Plastics Glass Foams Fabrics Concrete Panal Elastomers and Soils Viscous Fluids User-defined materials Library of elements Some of the types of elements available in LS-DYNA: Beams (standard, trusses, discrete, cables and welds) (with more than 10 beam element formulations) Discrete elements (springs and dampers) Bulging inertia atroertic masses of sensors Sensors Seat belts Retractor conveyors Sliding shells (3, 4, 6 and 8 nodes, including 3D shells, membranes, 2D flat tension, flat tension and axisymmetric solids) (with more than 25 formulations of shell elements) Solids (4- and 10-node tetrahedrons, 6-node contact algorithms, and 8-node hexahedrons) (with more than 20 solid element formulations) SPH Elements Thick Shells (8-node) Contact Algorithms LS-DYNA's contact algorithms : Flexible body contact to rigid body contact Rigid body to rigid body contact to rigid body contact Edge-to-edge contact Edge-to-edge The automotive industry uses automotive shock capability and the safety of LS-DYNA occupants to vehicle designs. [4] LS-DYNA accurately predicts the behavior of a car in a collision and the effects of the collision on the occupants of the car. With LS-DYNA, automotive companies and their suppliers can test car designs without having to or experimentally test a prototype, thus saving time and expense. Specialized automotive features of LS-DYNA: Seat belts Sliding rings Pretensioners Retractors Airbags Hybrid III Accelerometer Sensors dummy models Models Inflated inflators Formed with LS-DYNA One of the applications of LS-DYNA is the formation of sheets. [4] LS-DYNA accurately predicts the stresses and deformations experienced by the metal, and determines whether the metal will fail. LS-DYNA supports adaptive remeshing and will refine the mesh during analysis, as needed, to increase accuracy and save time. Metal forming applications for LS-DYNA include: Metal stamping Hydroforming Forging Deep drawing Multi-stage processes LS-DYNA aerospace industry applications are used by the aerospace industry to simulate bird strike,[6][4] jet engine blade containment and structural failure. Aerospace applications for LS-DYNA include: Leaf Containment Bird Strike (Windshield, and Engine Blade) Fault Analysis Other applications LS-DYNA applications include: Drop Testing Can and Shipping Container Design Electronic Design Glass Forming Plastics, Mold and blow forming Biomedical (heart valves) Metal cutting Earthquake engineering Fault analysis Sports equipment (golf clubs, golf balls, baseballs, helmets) Civil engineering (offshore platforms, pavement design) References from to b c d Dr. David J. The history of LS-DYNA (PDF). University of California, San Diego. Retrieved 2009-03-25. (b) Ansys-LSTC. Ansys acquires LSTC. Ansys, Inc. Retrieved 2020-06-11. a b c d e f g h i LSTC. LS-DYNA Keyword User's Manual, Volume 1 (PDF). Livermore Software Technology Corporation (LSTC). Retrieved 2009-03-25. Seshu Nimmala. A comparison of DYNA3D, NIKE3D and LS-DYNA. Oregon State University. Archived from the original on 15 April 2012. Retrieved 2014-01-15. • a b c LSTC, LS-DYNA Applications, retrieved on February 2, 2017 External Links LSTC Company Website Papers from European and International LS-DYNA User Conferences Examples and Class Notes for Download Training and Class Notes for Download Retrieved from