/ STRUCTURES	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA
GEOMETRIC IDEALIZATION					
Spring	●	●	▲	●	●
Mass	●	●	●	●	●
Damper	●	●		●	●
Spar	●	●	●		
Beam	●	●	●	●	●
Pipe/Elbow	●	●	●		
Shell - Thin	●	●	●	●	●
Layered Shell - Thin (Composite)	●	●		●	●
Shell - Thick (Solid Shell)	●	●	●		
Layered Shell - Thick (Solid Shell) (Composite)	●	●	●		
2D Plane / Axisymmetric	●	●	●	●	●
3D Solids	●	●	●	●	●
Layered 3D Solids (Composite)	●	●			
Infinite Domain	●	●	●	●	●
2.5D	●	●			
Reinforced	●	●		●	●
Coupled Field ROM Element Technology	●				
Substructuring / Matrix	●				

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	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA
MODELING CAPABILITIES					
Contact - Linear	●	●	●	●	●
Contact - Nonlinear	●	●	●	●	●
Joints	●	●	●	●	●
Spot Welds	●	●	●	●	●
Element Birth and Death	●	●			
Gasket Elements	●				
Rezoning and Adaptive Remeshing	●			●	●
Inverse Analysis	●				
MATERIALS					
Basic Linear Materials (Linear, Anisotropic, Temperature Dependent)	●	●	●	●	●
Basic Nonlinear Materials (Hyper, Plasticity, Rate Independent,Isotropic, Concrete)	●	●	▲	●	●
Advanced Nonlinear Materials (Rate dependent, Anisotropic, Damage Models,Geomechanics Materials, Multiphysics)	●			●	●
Field Dependent	●	●		●	
Reactive Materials	●				
Fracture Mechanics and Crack Growth	●				
Material Designer	●				
GRANTA Materials Data for Simulation	■[7]	■[7]	■[7]		

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COMPOSITE MATERIALS					
Material Definitions	●	●		●	●
Layers Definitions	●	▲		●	●
Interface Plies	●				
Advanced Modeling Features	●				
Variable Material Data	●				
Solid Extrusion	●				
Lay-Up Mapping	●				
Draping	●				
Lay-Up Exchange Interfaces	●				
Advanced Failure Criteria Library	●				
First-Ply Failure	●	●			
Last-Ply failure	●				
Delamination	●			●	●
Composite Cure Simulation	■[9]				
STRUCTURAL SOLVER CAPABILITIES					
Linear Static	●	●	●		
Nonlinear Static	●	●	●		
Pre-Stress Effects, Linear Perturbation	●	●	●	▲	▲
Nonlinear Geometry	●	●	●	●	●

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STRUCTURAL SOLVER CAPABILITIES (CONTINUED)					
Buckling - Linear Eigenvalue	●	●	●		
Buckling - Nonlinear Post Buckling Behavior	●	●	●		●
Buckling - Nonlinear Post Buckling Behavior - Arc Length	●	●			
Steady State Analysis Applied to a Transient Condition	●				
Advanced Wave Loading	●				
TOPOLOGY OPTIMIZATION					
Structural Optimization	●	●	●		
Modal Optimization	●	●	●		
Thermal Loads	●	●	●		
Inertial Loads	●	●	●		
Optimized Design Validation	●	●	●		
Manufacturing Constraints	●	●	●		
Stress constraints	●	●	●		
Symmetry	●	●	●		
Lattice Optimization	■[8]				
Overhang/Additive Constraints	■[8]				

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MULTI ANALYSIS					
Submodeling	●	●	●		
Data Mapping	●	●	●		
Multiphysics Data Mapping	●	●	▲		
Initial State	●	●		●	●
Advanced Multi-Stage 2-D to 3-D Analysis	●	●			
VIBRATIONS					
Modal	●	●	●		
Modal - Pre-Stressed	●	●	●		
Modal - Damped/Unsymmetric	●	●			
Transient - Mode-Superposition	●	●			
Harmonic - Mode-Superposition	●	●			
Harmonic - Full	●	●			
Spectrum	●	●			
Random Vibration	●	●			
Mistuning	●	●			
Rotordynamics	●	●			
Modal Acoustic	●				
Harmonic Acoustic	●				

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NONLINEAR TRANSIENT DYNAMICS					
Rigid Body Mechanisms	●	●			
Rigid Body Dynamics with CMS L Components for Flexible Bodies	●				
Full Transient	●	●		●	●
CMS with Substructuring	●				
EXPLICIT DYNAMICS					
FE (Lagrange) Solver	●			●	●
Euler Solvers				●	
Meshless Solvers	●			●	
Implicit-Explicit Deformations	●			●	●
Implicit-Explicit Material States	●			●	
Fluid-Structure Interaction (FSI)	●			●	
Mass Scaling	●			●	●
Natural Fragmentation	●			●	
Erosion Based on Multiple Criteria	●			●	●
De-Zoning				●	●
Part Activation and Deactivation (Multi Stage Analysis)				●	
Remapping in Space				●	
Remapping Solution Methods				●	

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DURABILITY					
Stress-Life (SN)	●	●	●		
Strain-Life (EN)	●	●	●		
Dang Van	■[1]	■[1]	■[1]		
Safety Factor	●	●	●		
Adhesive Bond	■[1]	■[1]	■[1]		
Crack Growth Linear Fracture Mechanics	■[1]	■[1]	■[1]		
Seam Weld	■[1]	■[1]	■[1]		
Spot Weld	■[1]	■[1]	■[1]		
Thermo-Mechanical Fatigue	■[1]	■[1]	■[1]		
Vibration Fatigue	■[1]	■[1]	■[1]		
Virtual Strain Gauge Correlation	■[1]	■[1]	■[1]		
Python Scripting Customization	■[1]	■[1]	■[1]		
WAVE HYDRODYNAMICS					
Diffraction and Radiation	●				
Frequency & Time Domain Motions Analysis	●				
Moorings, Joints & Tethers	●				
Load Transfer to Structural Analysis	●				

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THERMAL					
Steady State Thermal	●	●	●		
Transient Thermal	●	●	●		
Conduction	●	●	●	●	●
Convection	●	●	●		
Radiation to Space	●	●	●		
Radiation - Surface to Surface	●	●	●		
Phase Change	●	●	●	●	●
Thermal Analysis of Layered Shells and Solids	●	●	●		
ADDITIONAL PHYSICS					
1-D Thermal-Flow	●	●	●		
1-D Coupled-Field Circuits	●				
1-D Electromechanical Transducer	●				
MEMS ROM	●				
Piezoelectric	●				
Piezoresistive	●				
Electroelastic	●				
Electromagnetic	●				
Vibro-Acoustics	●				
Electro-Migration	●				

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ADDITIONAL PHYSICS (CONTINUED)					
Diffusion-Pore-Fluid	●				
Diffusion-Thermal Structural-Electric	●				
Structural-Thermal-Electric-Magnetic	●				
1-Way Fluid-Structure Interaction	■[2]	■[2]	■[2]		
2-Way Fluid-Structure Interaction	■[2]				
OPTIMIZATION					
DesignXplorer Included	●	●	●	■[3]	■[3]
Parameters	●	●	●	●	●
Design Point Studies	●	●	●	●	●
Correlation Analysis	●	●	●	●	
Design of Experiments	●	●	●	●	
Sensitivity Analysis	●	●	●	●	
Goal Driven Optimization	●	●	●	●	
Six Sigma Analysis	●	●	●	●	
MISCELLANEOUS AND USABILITY					
ANSYS SpaceClaim	●	■[4]	■[4]	■[4]	■[4]
ANSYS Customization Suite (ACS)	●	■[5]	■[5]	■[5]	■[5]
Support ACT Extensions	●	●	●	●	●
Command Snippet Support	●	●	●		

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MISCELLANEOUS AND USABILITY (CONTINUED)					
Batch run capability	●	●	●	●	●
Read/Write 3rd Party Matrix CAE Data	●	●		●	●
CDB and 3rd party FE Model Import	●	●	●		●
Nastran Bulk File Export	●	●	●		
HPC - STRUCTURES					
Default Number of Cores	4 (DMP + SMP) MAPDL 4 for Explicit 4 for RBD MAPDL 4 for AQWA	4 (DMP + SMP)	4 (DMP + SMP)	1	1
Parallel Solving on Local PC	●	●	●	●	●
Parallel Solving on Cluster	●	●	●	●	●
GPU Acceleration	MAPDL - ■ 6 Explicit - No RBD - No AQWA - No	■6	■6		
Parallel Solving with ANSYS Cloud Launched from Desktop	MAPDL - Yes Explicit - No RBD - No AQWA - No	MAPDL - Yes RBD - No	MAPDL - Yes		●

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