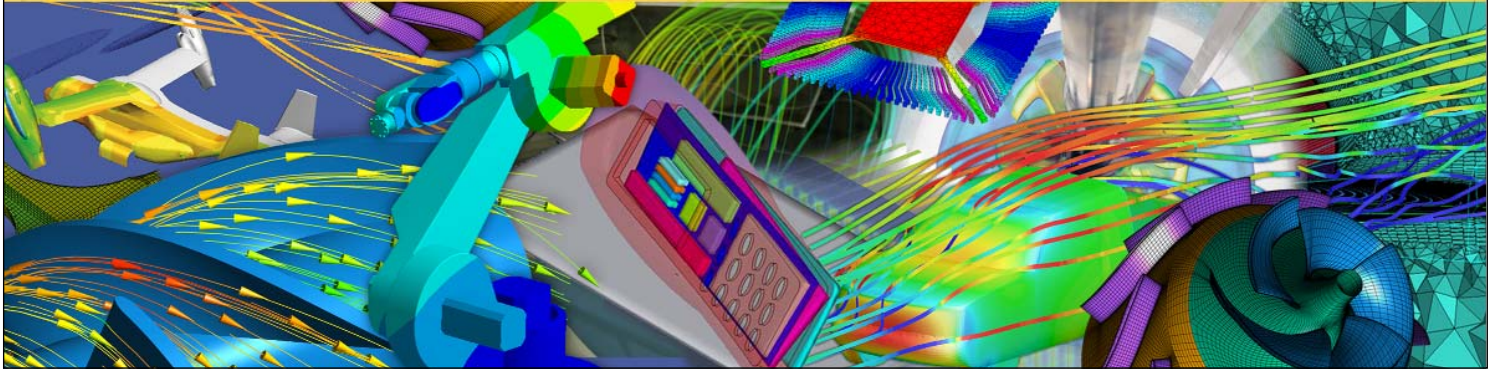


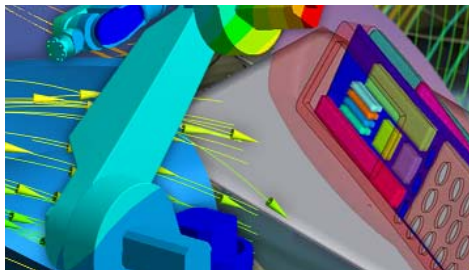
Capabilities Chart

A comprehensive checklist of ANSYS capabilities

11.0 RELEASE



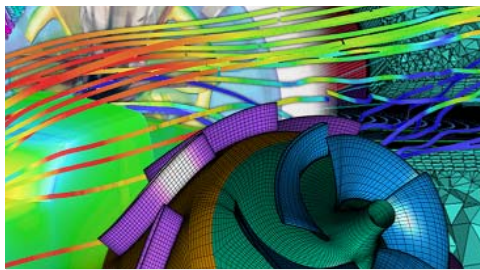
ANSYS® ANSYS® ICEM CFD™ ANSYS® CFX®	Complete Simulation Solutions											Pre/Post Solutions		
	Multiphysics™	Mechanical™	Structural™	Professional™	Professional NLS	DesignSpace®	DesignSpace Structural	Emag™	CFX®	ED™	LS-DYNA®	Advanced Meshing	CFX PrepPost™	ANSYS PrepPost™
Capability														
Structural Analysis														
Analysis Types														
Static	•	•	•	•	•	•	•			•				
Modal	•	•	•	•	•	•	•			•				
Buckling - linear	•	•	•	•	•	•	•			•				
Buckling - nonlinear	•	•	•							•	•			
Transient	•	•	•	[C-1]	[C-1]					•				
Spectrum	•	•	•	•	•					•				
Harmonic	•	•	•	[C-1]	[C-1]					•				
Random vibration	•	•	•							•				
Substructuring	•	•	•							•				
Shape optimization	•	•	•	•	•	•	•			•				
Geometric Nonlinearity														
Large strain	•	•	•		•					•	•			
Large deflection	•	•	•	[C-2]	•					•	•			
Stress stiffening	•	•	•	•	•					•				
Spin softening	•	•	•	•	•					•				
Material Modeling														
Linear material models	•	•	•	•	•	•	•			•	•			
Nonlinear material models	•	•	•		[C-3]					•	•			
Contact Modeling														
Surface-to-surface	•	•	•	•	•	•	•			•	•			
Node-to-surface	•	•	•	•	•					•	•			
Node-to-node	•	•	•	•	•					•				
Beam-to-beam	•	•	•	•	•					•				
Beam-to-surface	•	•	•	•	•					•				
Pretension (bolts, etc.)	•	•	•	•	•	•	•			•				
Interface (gaskets)	•	•	•	•	•					•				
Spot welds	•	•	•	•	•					•				



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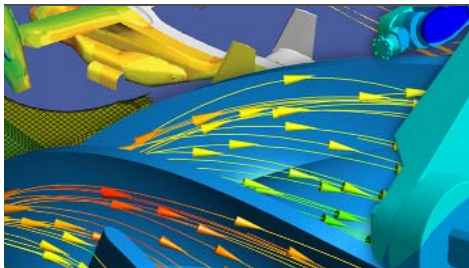
	Multiphysics™	Mechanical™	Structural™	Professional™	Professional NLS	DesignSpace®	DesignSpace® Structural	Emag™	CFX®	ED™	LS-DYNA™	Advanced Meshing	CFX® PrepPost™	ANSYS® PrepPost™
Advanced Analysis														
Rotordynamics	•	•	•	•	•					•				
Component mode synthesis	•	•	•							•				
Cyclic symmetry analysis	•	•	•	•	•					•				
Rezoning	•	•	•							•				
Submodeling	•	•	•	•	•					•				
Element birth and death	•	•	•	•	•					•				
Thermal Analysis														
Analysis Types														
Steady-state	•	•		•	•	•			•	•				
Transient	•	•		•					•	•				
Thermal Modeling														
Conduction	•	•		•	•	•			•	•				
Convection	•	•		•	•	•			•	•				
Radiation	•	•		•					•	•				
Phase change	•	•		•					•	•				
Fluid Dynamics														
Steady-state/transient flow	•								•	•				
Incompressible/compressible flow	•								•	•				
Laminar/turbulent flow	•								•	•				
Forced and natural convection	•								•	•				
Conjugate and radiation heat transfer	•								•	•				
Multiple species transport	•								•	•				
Newton and non-Newtonian viscosities	•								•	•				
Rotating frames of reference	•								•	•				
Distributed resistances and sources	•								•	•				
Free surfaces by VOF method	2-D								3-D	2-D				
Deformable meshes (ALE formulation)	•								•	•				
Porous media model	•								•	•				
Solution-based mesh adaption									•					
Generalized grid interfaces									•					
Equilibrium real gas thermodynamics									•					
Multiple frames of reference									[C-4]					
Lagrangian particle tracking									[C-4]					
Multiphase flows									[C-4]					
Reacting and combusting species									[C-4]					
Predictive laminar to turbulent transition model									[C-4]					
Monte Carlo radiation model									[C-4]					
Scalable parallel performance									[C-4]					
Electromagnetics – Low-Frequency														
Electrostatics	•							•		•				
Magnetostatics	•							•		•				
Low-frequency electromagnetics	•							•		•				
Current conduction	•							•		•				
Circuit analysis and coupling	•							•		•				
Ion optics— charged particles	•							•		•				
Low-frequency electric	•							•		•				
Low-frequency magnetic	•							•		•				
Steady-state	•							•		•				
Harmonic	•							•		•				
Transient	•							•		•				



Complete Simulation Solutions

Pre/Post Solutions

	Multiphysics™	Mechanical™	Structural™	Professional™	Professional NLS	DesignSpace®	DesignSpace® Structural	Emag™	CFX®	ED™	LS-DYNA™	Advanced Meshing	CFX® PrepPost™	ANSYS® PrepPost™
Electromagnetics – High-Frequency														
Modal	•									•				
Harmonic	•									•				
Scattering	•									•				
Perfect electric & magnetic conductors	•									•				
Impedance boundaries	•									•				
Perfectly matched absorber boundaries	•									•				
Near and far field extension	•									•				
Periodic structures	•									•				
Frequency selective surface (FSS)	•									•				
Antenna radiation patterns	•									•				
Radar cross section (RCS)	•									•				
Specific absorption rate (SAR)	•									•				
Coupled Physics														
Acoustics	•	•								•				
Acoustics-structural	•	•								•				
Electric-magnetic	•							•		•				
Fluid-structural	•	[C-5]							[C-5]	•				
Fluid-thermal	•								•	•				
Electromagnetic-fluid	•									•				
Magnetic-structural	•									•				
Electromagnetic-thermal	•									•				
Piezoelectric	•	•								•				
Piezoresistive	•									•				
Thermal-electric	•	•		•						•				
Thermal-structural	•	•		•	•	•	•			•				
Thermal-electric-structural	•									•				
Electromagnetic-thermal-structural	•									•				
Electrostatic-structural	•									•				
Reduced order modeling (ROM)	•									•				
Multi-field general purpose solver	•	[C-5]							[C-5]	•				
Solvers														
Iterative	[C-6]	[C-6]	[C-6]	[C-6]	[C-6]	•	•	[C-6]		•				
Sparse direct	[C-6]	[C-6]	[C-6]	[C-6]	[C-6]	•	•	[C-6]		•				
Frontal (wavefront)	[C-6]	[C-6]	[C-6]	[C-6]	[C-6]			[C-6]		•				
Algebraic multi-grid (AMG)	[C-6]	[C-6]	[C-6]	[C-6]	[C-6]				•					
Distributed memory PCG	[C-6]	[C-6]	[C-6]	[C-6]	[C-6]									
Distributed memory JCG	[C-6]	[C-6]	[C-6]	[C-6]	[C-6]									
Distributed sparse (Dsparse)	[C-6]	[C-6]	[C-6]	[C-6]	[C-6]			[C-6]						
Explicit										•	•			
Pre-processing														
Solid modeling	•	•	•	•	[C-7]	[C-7]	[C-7]	•		•	•	[C-7]	[C-7]	•
IGES geometry transfer	•	•	•	•	•	•	•	•		•	•	•	•	•
Defeaturing	•	•	•	•	[C-7]	[C-7]	[C-7]	•		•	•	•	[C-7]	•
Geometry repair	•	•	•	•	[C-7]	[C-7]	[C-7]	•		•	•	•	•	•
Faceted data handling												•		
Shrinkwrapping												•		
Midsurfacing	•	•	•	•	[C-7]	[C-7]	[C-7]			•		•	[C-7]	•
Variable thickness mid-surfacing												•		
Beam modeling	•	•	•	•	•					•		•		•
Automatic surface meshing	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Automatic tetrahedral meshing	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Automatic prism inflation layers	•	•	•	•	•				•	•		•	•	•
Automatic hexa-core meshing												•	•	
Automatic swept hex-meshing	•	•	•	•	•	•	•		•	•		•	•	•
Thin-sweep meshing	•	•	•	•	•	•	•		•	•		•	•	•
Automatic hexa-dominant meshing	•	•	•	[C-8]	[C-8]	[C-8]	[C-8]		•	•	[C-8]	•	•	[C-8]



Complete Simulation Solutions

Pre/Post Solutions

	Multiphysics™	Mechanical™	Structural™	Professional™	Professional NLS	DesignSpace®	DesignSpace® Structural	Emag™	CFX®	ED™	LS-DYNA™	Advanced Meshing	CFX® PrepPost™	ANSYS® PrepPost™
Body-fitted Cartesian meshing												•		
Structured surface meshing (blocking)												•		
Structured hex meshing (blocking)												•		
Solid model loads and boundary	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tabular loads and boundary	•	•	•	•	•			•	•	•	•	•	•	•
Function loads and boundary	•	•	•	•	•			•	•	•	•		•	•
CFD boundary conditions									•			[C-9]	•	
CFX command expression language									•				•	
CFD turbomachinery pre-processing									[C-10]			•	[C-10]	
Parameterization of an existing mesh	[C-11]	[C-11]	[C-11]	[C-11]	[C-11]			[C-11]	[C-11]	[C-11]	[C-11]	[C-11]	[C-11]	•
Mesh morphing	•	[C-11]	[C-11]	[C-11]	[C-11]			[C-11]	[C-11]	[C-11]	[C-11]	•	[C-11]	[C-11]
Mesh editing	•	•	•	•	•			•		•	•	•		•
Mesh repair (remeshing, etc)	•							•				•		
Post-Processing														
Contour displays	•	•	•	•	•	•	•	•	•	•	•	•		
Vector displays	•	•	•	•	•	•	•	•	•	•	•	•		
Isosurface displays	•	•	•	•	•	•	•	•	•	•	•	•		
Slicing planes	•	•	•	•	•	•	•	•	•	•	•	•		
Quantitative calculations	•	•	•	•	•			•	•	•	•	•		
Particle tracing	•					•	•	•	•	•	•	•		
Animations	•	•	•	•	•	•	•	•	•	•	•	•		
Annotated graphs	•	•	•	•	•	•	•	•	•	•	•	•		
Results listings	•	•	•	•	•	•	•	•	•	•	•	•		
Output (VMRL, Postscript, TIFF, etc.)	•	•	•	•				•	•	•	•	•		
CFD turbomachinery post-processing									•				•	
General														
Report generator	•	•	•	•	•	•	•	•	•	•	•			•
Probabilistic design system	•	•	•	•	•	•	•	•	•	•	•			
Robust design	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	•	[C-12]			
Design optimization	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]	[C-12]		•	[C-12]			•
ANSYS Parametric Design Language	•	•	•	•	•			•	[C-12]	•	•			•
CFX command language									•				•	
Parameter manager	•	•	•	•	•	•	•	•	•	•	•	•		•
CAD parameter access	[C-13]	[C-13]	[C-13]	[C-13]	[C-13]	[C-13]	[C-13]	[C-13]	[C-13]	[C-13]		•		

[C-1] Limited to mode-superposition method only
 [C-2] Not available for 2-D plane and 3-D solid elements
 [C-3] Limited hyperelasticity and plasticity nonlinear material support
 [C-4] Available through an add-on module
 [C-5] ANSYS Mechanical and ANSYS CFX can be used together for two-way FSI analysis

[C-6] More than 2 processors are available through the ANSYS Mechanical HPC add-on module
 [C-7] Available with ANSYS DesignModeler product
 [C-8] Available through the Advanced Structural Meshing add-on module
 [C-9] Available with CFD Utilities add-on for AI*Environment

[C-10] In addition, ANSYS BladeModeler and ANSYS TurboGrid complete our specialized turbomachinery solution
 [C-11] Available with the ANSYS Mesh Morpher product
 [C-12] Available through the ANSYS DesignXplorer add-on module
 [C-13] Available as geometry Interface for various CAD systems



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