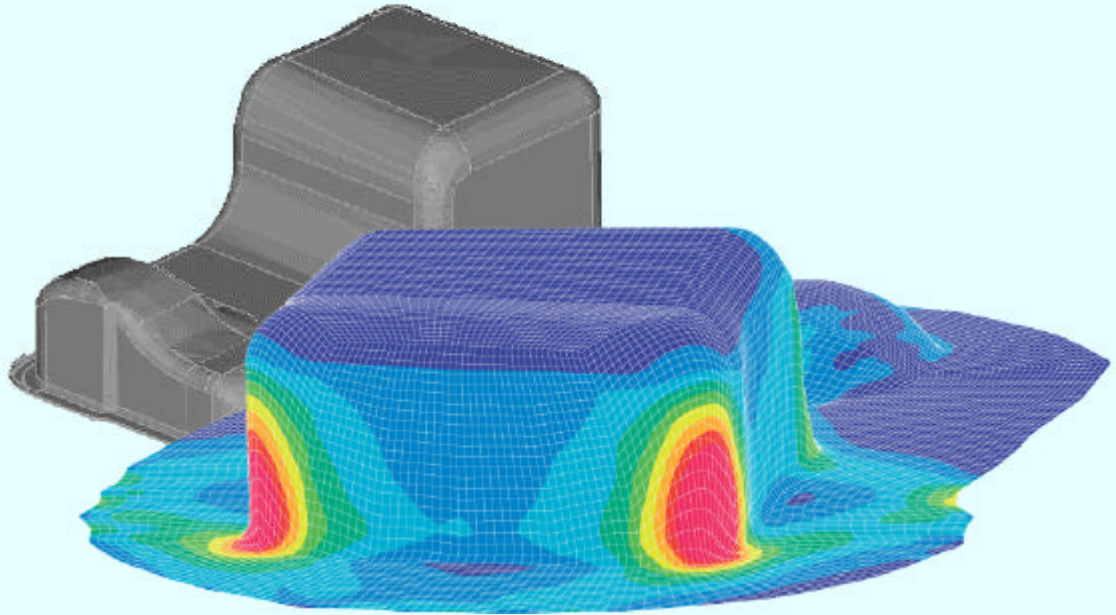


A D I N A

SYSTEM OVERVIEW



Deep drawing of an oil pan

Programs

ADINA

Structural analysis

ADINA-F

Incompressible and fully compressible flows

ADINA-T

Heat transfer and field problems

ADINA-FSI

Fluid flows with structural interaction

ADINA-TMC

Thermo-mechanical coupling

AUI

ADINA User Interface

ADINA-M / AUI

ADINA User Interface with solid modeling

TRANSOR

Interface to I-DEAS, MSC.Patran

900-NODE VERSION

Promotional version

Available on UNIX, Windows and Linux

ADINA

The Finite Element System for Structures, Heat Transfer and CFD

Our Mission

The mission of ADINA R & D is to provide ONE finite element program system – the ADINA System – that can be used to perform comprehensive finite element analysis of structures, heat transfer, fluids, and their interactions, all in one.

Application Examples

- ☛ Earthquake analysis of large bridges (San Francisco-Oakland Bay Bridge)
- ☛ Implicit / static solution of car roof crush “rollover” (Ford Windstar, Ford Taurus)
- ☛ Metal forming simulation using implicit / static solution (deep drawing, stamping, rolling)
- ☛ Hydro-forming of metals and plastics
- ☛ Fluid flow-structure interaction analysis of refrigerator compressors
- ☛ Analysis of car headlamp (specular radiosity, humidity, lens distortions)
- ☛ Earthquake sloshing analysis of large tanks
- ☛ Acoustic solution coupled with CFD (microphones, speakers, hearing aids)
- ☛ Dynamic wave propagation analysis (simulation of drop tests)
- ☛ Consolidation and undrained analysis of porous media (dams, tunnels, bridges)
- ☛ Thermo-mechanical coupled analysis of brakes (contact, friction, heat generated by friction)
- ☛ Analysis of MEMS devices
- ☛ Fluid flow-structure interaction analysis of automobile components (ABS braking systems, pumps, shock absorbers)
- ☛ Fluid flow-structure interaction analysis in bioengineering (flow through blood vessels, artificial lung, artificial heart, brain damage)
- ☛ Analysis of nuclear pressure vessels (fluid-structure interaction, contact, material nonlinearity, creep)
- ☛ High Mach number CFD with structural interaction (rocket launching)
- ☛ Analysis of tires (rubber, contact, aquaplaning)
- ☛ Simulation of excavation and construction of tunnels
- ☛ Fracture mechanics analysis of structural components (nuclear reactors, turbines, concrete, pressure vessels)
- ☛ CFD and structural analysis of heat exchangers
- ☛ Analysis of large roofs (hangers, stadiums, airports)
- ☛ Analysis of concrete structures
- ☛ Analysis of fabric structures with wrinkling
- ☛ Bearing simulation (contact, fluid flow-structure interaction)

ADINA

| | ADINA | ADINA-F | ADINA-T | ADINA-FSI | ADINA-TMC | AUI | ADINA-M / AUI | TRANSOR | 900-Node Version |
|-------------------------------------|-------|---------|---------|-----------|-----------|-----|---------------|---------|------------------|
| Structural Linear | | | | | | | | | |
| Statics | ✓ | | | ✓ | ✓ | | | | ✓ |
| Transient implicit | ✓ | | | ✓ | ✓ | | | | ✓ |
| Transient explicit | ✓ | | | | | | | | ✓ |
| Frequency | ✓ | | | | | | | | ✓ |
| Mode superposition | ✓ | | | | | | | | ✓ |
| Cyclic symmetry | ✓ | | | | | | | | ✓ |
| Substructuring | ✓ | | | | | | | | ✓ |
| Acoustic fluids | ✓ | | | ✓ | ✓ | | | | ✓ |
| Structural Nonlinear | | | | | | | | | |
| Material nonlinearity | ✓ | | | ✓ | ✓ | | | | ✓ |
| Large deformations | ✓ | | | ✓ | ✓ | | | | ✓ |
| Large strains (2-D, 3-D, shell) | ✓ | | | ✓ | ✓ | | | | ✓ |
| Statics | ✓ | | | ✓ | ✓ | | | | ✓ |
| Transient implicit | ✓ | | | ✓ | ✓ | | | | ✓ |
| Transient explicit | ✓ | | | | | | | | ✓ |
| Contact | ✓ | | | ✓ | ✓ | | | | ✓ |
| Frequency, frequency with contact | ✓ | | | | | | | | ✓ |
| Mode superposition | ✓ | | | | | | | | ✓ |
| Fracture mechanics | ✓ | | | | | | | | ✓ |
| Porous media | ✓ | | | ✓ | ✓ | | | | ✓ |
| Substructuring | ✓ | | | | | | | | ✓ |
| Restart, mapping solution | ✓ | | | ✓ | ✓ | | | | ✓ |
| Element birth / death | ✓ | | | ✓ | ✓ | | | | ✓ |
| Initial strains / stresses | ✓ | | | ✓ | ✓ | | | | ✓ |
| Automatic time stepping | ✓ | | | ✓ | ✓ | | | | ✓ |
| User-supplied elements | ✓ | | | | | | | | |
| Structural Materials | | | | | | | | | |
| Elastic | ✓ | | | ✓ | ✓ | | | | ✓ |
| Thermoelastic, thermoplastic | ✓ | | | ✓ | ✓ | | | | ✓ |
| Plastic (isotropic, orthotropic) | ✓ | | | ✓ | ✓ | | | | ✓ |
| Creep | ✓ | | | ✓ | ✓ | | | | ✓ |
| Rubber | ✓ | | | ✓ | ✓ | | | | ✓ |
| Geotechnical | ✓ | | | ✓ | ✓ | | | | ✓ |
| Concrete | ✓ | | | ✓ | ✓ | | | | ✓ |
| Viscoelastic | ✓ | | | ✓ | ✓ | | | | ✓ |
| Moment-curvature | ✓ | | | ✓ | ✓ | | | | ✓ |
| Strain-rate dependency | ✓ | | | ✓ | ✓ | | | | ✓ |
| User-supplied materials | ✓ | | | ✓ | ✓ | | | | |
| Contact of Structures | | | | | | | | | |
| Self contact | ✓ | | | ✓ | ✓ | | | | ✓ |
| Surface to surface | ✓ | | | ✓ | ✓ | | | | ✓ |
| Node to surface | ✓ | | | ✓ | ✓ | | | | ✓ |
| Node to node | ✓ | | | ✓ | ✓ | | | | ✓ |
| Tied contact | ✓ | | | ✓ | ✓ | | | | ✓ |
| Rigid targets | ✓ | | | ✓ | ✓ | | | | ✓ |
| Post-impact corrections | ✓ | | | ✓ | ✓ | | | | ✓ |
| Metal forming features | ✓ | | | ✓ | ✓ | | | | ✓ |
| Solution in Frequency Domain | | | | | | | | | |
| Response spectrum | ✓ | | | | | | | | ✓ |
| Fourier analysis | | | | | | ✓ | ✓ | | ✓ |
| Harmonic vibration | ✓ | | | | | ✓ | ✓ | | ✓ |
| Random vibration | ✓ | | | | | ✓ | ✓ | | ✓ |
| Floor response spectrum | | | | | | ✓ | ✓ | | ✓ |

ADINA

| | ADINA | ADINA-F | ADINA-T | ADINA-FSI | ADINA-TMC | AUI | ADINA-M / AUI | TRANSOR | 900-Node Version |
|---|-------|---------|---------|-----------|-----------|-----|---------------|---------|------------------|
| Frequency Analysis of Structures | | | | | | | | | |
| Lanczos | ✓ | | | | | | | | ✓ |
| Subspace | ✓ | | | | | | | | ✓ |
| Determinant search | ✓ | | | | | | | | ✓ |
| Buckling of Structures | | | | | | | | | |
| Linearized buckling | ✓ | | | | | | | | ✓ |
| Collapse (nonlinear) analysis | ✓ | | | | | | | | ✓ |
| CFD | | | | | | | | | |
| Steady-state | | ✓ | | ✓ | | | | | ✓ |
| Transient | | ✓ | | ✓ | | | | | ✓ |
| Incompressible flows | | ✓ | | ✓ | | | | | ✓ |
| Slightly compressible flows | | ✓ | | ✓ | | | | | ✓ |
| Low-speed compressible flows | | ✓ | | ✓ | | | | | ✓ |
| High-speed compressible flows | | ✓ | | ✓ | | | | | ✓ |
| K-ε, K-ω turbulence models | | ✓ | | ✓ | | | | | ✓ |
| Flow through porous media | | ✓ | | ✓ | | | | | ✓ |
| Natural / forced convection | | ✓ | | ✓ | | | | | ✓ |
| Conjugate heat transfer | | ✓ | | ✓ | | | | | ✓ |
| Mass transfer | | ✓ | | ✓ | | | | | ✓ |
| Solid elements | | ✓ | | ✓ | | | | | ✓ |
| Automatic nondimensionalization procedure | | ✓ | | ✓ | | | | | ✓ |
| Automatic time stepping, CFL option | | ✓ | | ✓ | | | | | ✓ |
| Restart, mapping solution | | ✓ | | ✓ | | | | | |
| Constraint conditions | | ✓ | | ✓ | | | | | ✓ |
| Element birth / death | | ✓ | | ✓ | | | | | ✓ |
| Include / exclude hydrostatic pressure | | ✓ | | ✓ | | | | | ✓ |
| Automatic remeshing | | ✓ | | ✓ | | | | | |
| CFD Boundary Conditions | | | | | | | | | |
| Prescribed solution variables | | ✓ | | ✓ | | | | | ✓ |
| Prescribed rotational velocity | | ✓ | | ✓ | | | | | ✓ |
| Concentrated / distributed loads | | ✓ | | ✓ | | | | | ✓ |
| Field centrifugal load | | ✓ | | ✓ | | | | | ✓ |
| Concentrated / distributed heat flow | | ✓ | | ✓ | | | | | ✓ |
| Heat and mass convections | | ✓ | | ✓ | | | | | ✓ |
| Radiation / specular radiation | | ✓ | | ✓ | | | | | ✓ |
| Angular velocity | | ✓ | | ✓ | | | | | ✓ |
| Fluid-structure interface | | ✓ | | ✓ | | | | | ✓ |
| Free surface | | ✓ | | ✓ | | | | | ✓ |
| Fluid-fluid interface | | ✓ | | ✓ | | | | | ✓ |
| Phase change | | ✓ | | ✓ | | | | | ✓ |
| Gap | | ✓ | | ✓ | | | | | ✓ |
| External flow | | ✓ | | ✓ | | | | | ✓ |
| Supersonic / subsonic flow at inlet | | ✓ | | ✓ | | | | | ✓ |
| Supersonic / subsonic flow at outlet | | ✓ | | ✓ | | | | | ✓ |
| User-supplied boundary conditions | | ✓ | | ✓ | | | | | |
| CFD Material Models | | | | | | | | | |
| Constant | | ✓ | | ✓ | | | | | ✓ |
| Time-dependent | | ✓ | | ✓ | | | | | ✓ |
| Temperature-dependent | | ✓ | | ✓ | | | | | ✓ |
| Pressure-dependent | | ✓ | | ✓ | | | | | ✓ |
| Pressure-temperature-dependent | | ✓ | | ✓ | | | | | ✓ |
| Non-Newtonian | | ✓ | | ✓ | | | | | ✓ |
| User-supplied materials | | ✓ | | ✓ | | | | | |
| Acoustic fluids | ✓ | | | ✓ | ✓ | | | | ✓ |

ADINA

| ADINA | ADINA-F | ADINA-T | ADINA-FSI | ADINA-TMC | AUI | ADINA-M / AUI | TRANSOR | 900-Node Version |
|-------|---------|---------|-----------|-----------|-----|---------------|---------|------------------|
|-------|---------|---------|-----------|-----------|-----|---------------|---------|------------------|

| Thermal Analysis of Structures | | | | | | | | |
|--|---|---|---|---|---|---|---|---|
| Steady-state | | | ✓ | | ✓ | | | ✓ |
| Transient | | | ✓ | | ✓ | | | ✓ |
| Conduction | | | ✓ | | ✓ | | | ✓ |
| Convection | | | ✓ | | ✓ | | | ✓ |
| Radiation | | | ✓ | | | | | ✓ |
| Phase change | | | ✓ | | ✓ | | | ✓ |
| Seepage | | | ✓ | | ✓ | | | ✓ |
| Joule-heating | | | ✓ | | ✓ | | | ✓ |
| Element birth / death | | | ✓ | | ✓ | | | ✓ |
| Automatic time stepping | | | ✓ | | ✓ | | | ✓ |
| User-supplied materials | | | ✓ | | ✓ | | | ✓ |
| Multiphysics, Coupled Problems | | | | | | | | |
| Potential based (acoustic) fluids / structures | ✓ | | | ✓ | | | | ✓ |
| Incompressible fluids / structures | | | | ✓ | | | | |
| Slightly compressible fluids / structures | | | | ✓ | | | | |
| Low speed compressible fluids / structures | | | | ✓ | | | | |
| High speed compressible fluids / structures | | | | ✓ | | | | |
| Thermo-structural (one way) | ✓ | | | | ✓ | | | ✓ |
| Thermo-mechanical coupling, plastic work and / or frictional contact | | | | | ✓ | | | |
| Thermal-electric | | | ✓ | | ✓ | | | |
| Piezoelectric | | | ✓ | | ✓ | | | |
| Solvers | | | | | | | | |
| Sparse | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| Iterative | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| Multigrid | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| Direct skyline | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| Explicit | ✓ | ✓ | | | | | | ✓ |
| Preprocessing / Postprocessing for Structures and CFD | | | | | | | | |
| Graphical User Interface | | | | | | ✓ | ✓ | ✓ |
| Solid modeling | | | | | | | ✓ | |
| Automatic meshing | | | | | | ✓ | ✓ | ✓ |
| Mapped meshing | | | | | | ✓ | ✓ | ✓ |
| Direct finite element input | | | | | | ✓ | ✓ | ✓ |
| Interactive graphics, OpenGL | | | | | | ✓ | ✓ | ✓ |
| Vector image output | | | | | | ✓ | ✓ | ✓ |
| Bitmap image output | | | | | | ✓ | ✓ | ✓ |
| AVI movie output | | | | | | ✓ | ✓ | ✓ |
| Graphs, listings | | | | | | ✓ | ✓ | ✓ |
| Parametric input | | | | | | ✓ | ✓ | ✓ |
| IGES geometry input | | | | | | ✓ | ✓ | ✓ |
| Macros, shortcut keys | | | | | | ✓ | ✓ | ✓ |
| Icon customization | | | | | | ✓ | ✓ | ✓ |
| Online documentation | | | | | | ✓ | ✓ | ✓ |
| CAD Support for Structures & CFD | | | | | | | | |
| SolidWorks | | | | | | | ✓ | |
| Pro/ENGINEER | | | | | | ✓ | ✓ | |
| Unigraphics, SolidEdge | | | | | | | ✓ | |
| All Parasolid-based CAD programs | | | | | | | ✓ | |
| Mechanical Desktop | | | | | | | ✓ | |
| I-DEAS | | | | | | | | ✓ |
| MSC.Patran | | | | | | | | ✓ |
| Parallel Versions | ✓ | ✓ | ✓ | ✓ | ✓ | | | |

PROGRAM DISTRIBUTION

ADINA R&D, Inc

71 Elton Avenue, Watertown, MA 02472, USA
Tel: (617) 926-5199, Fax: (617) 926-0238
Email: info@adina.com

Japan:

Information Services International-Dentsu, Ltd.

4-11-10 Nakano, Nakano-ku, Tokyo 164, Japan
Tel: 81 (3) 3228 6183, Fax: 81 (3) 3319 6947
Email: nami@isid.co.jp

NewtonWorks Corporation

1-16-10 Oak-Bldg., Kyobashi, Chuo-Ku, Tokyo, 104-0031, Japan
Tel: 81 (3) 3535 2631, Fax: 81 (3) 3535 2640
Email: msasaki@newtonworks.co.jp

Sweden, Finland, Norway & Denmark:

ASUPPORT

Karlsbergplatsen 8, S-46260 Vänersborg, Sweden
Tel: 46 (521) 66140
Email: 57sundqvist@telia.com

United Kingdom:

Product Development Services Limited

5 Reservoir Rd., Solihull, West Midlands B92 8BA, UK
Tel: 44 (0)1926 490035, Fax: 44 (0)1926 490095
Email: jasw@pdslimited.com

Italy:

ENCAE

P.zza 5 Giornate 10, 20129 Milano
Tel: 02 5511954
Mobile: 349 8090414
Email: elionovia@virgilio.it

Czech Republic, Poland, Slovakia, Russia

RIE s.r.o.

Hnevkovskeho 65, 61700 Brno
Czech Republic
Email: rie@rie.cz
www.rie.cz

Germany & Austria:

ISKO engineers AG

Knorrstraße 142, 80937 München, Germany
Tel: 49 (0) 89 37062-0
Fax: 49 (0) 89 37062-191
Email: info@isko-engineers.de

France:

MK2i

320 Rue Saint Honoré (1^{er} étage, fond cours), 75001 Paris, France
Tel: 33 (01) 47 67 08 52, Fax: 33 (08) 25 23 52 73
Email: thirom@mk2i.com

China:

Radux Industry Technologies, Inc.

Rm. 1401, 14th floor, Tianyu Garden, No. 146,
Linhe Middle Road, Tianhe District, Guangzhou, 510610, China
Tel: 86 (20) 3885 3515/3530/2080, Fax: 86 (20) 3885 3686
Email: xy.ge@raduxtech.com

Korea:

ableMax, Inc.

2F, JJ Bldg., 120-17, Samsung-Dong, Kangnam-gu,
Seoul, 135-090 Korea
Tel: 82 (2) 539 5212
Fax: 82 (2) 539 5213
Email: sales@ablemax.co.kr

Taiwan:

FEA-Opt Technology

No. 12, Alley 22, Lane 275, Ba-De 2nd Road, Tonfen Town,
Miaoli County 351, Taiwan
Tel: 886 (3) 571 3637
Email: contact@FEA-Optimization.com

Focused on Excellence

ADINA R & D, Inc.

Telephone: (617) 926-5199 ■ Telefax: (617) 926-0238 ■ Email: info@adina.com

www.adina.com