

# NISA - Heat

Nisa-Heat is a general purpose finite element program to analyze a wide spectrum of problems encountered in heat transfer

## ANALYSIS FEATURES

- Linear and Nonlinear
  - Nonlinearity due to material properties and/or boundary conditions, such as temperature dependent thermal conductivity and phase change (melting and freezing)
- Steady state and transient
- Time integration techniques (forward difference, trapezoidal, backward difference)
- Constant or variable time step conditions
- Loading and boundary conditions may be time and/or temperature dependent
- Radiation effects with view factor calculation
- Restarts
- Automatic submodeling in user-defined regions for more accurate stress calculations

## MATERIAL PROPERTIES

- Isotropic and Orthotropic
- Time and/or temperature dependent

## LOADING

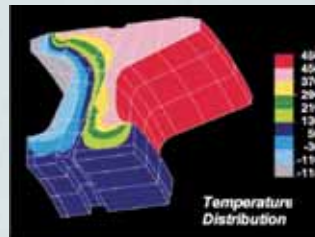
- Concentrated heat flows
- Distributed heat flux
- Internal heat generation, node or element

## BOUNDARY CONDITIONS

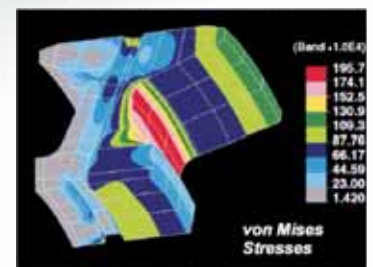
- Specified nodal temperature
- Coupled temperatures
- Convection and Radiation

## NONLINEAR CAPABILITIES

- Temperature dependent material properties
- Time and temperature dependent boundary conditions
  - Convection
  - Radiation
- Phase change (melting and freezing)
- Surface radiation with view factor calculation

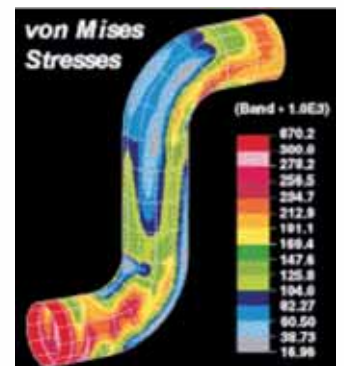
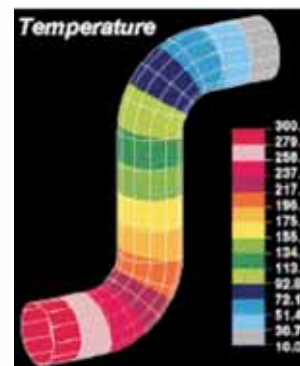


Heat Transfer in a Rotor with Circular Oil Holes

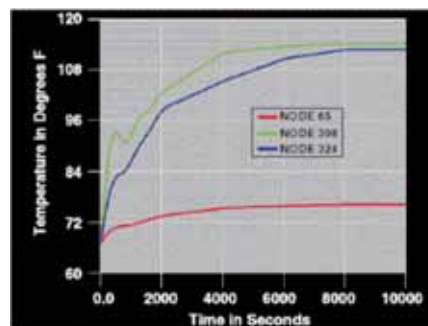


## OUTPUT

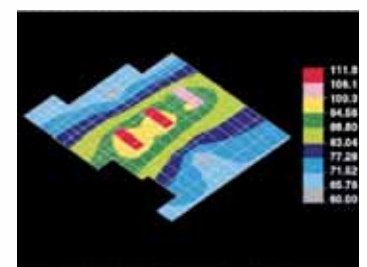
- Nodal temperature time history
- Temperature gradients in shells
- Temperature distribution at specified time step
- Nodal heat values



Conduction Through Pipe



Transient Heat Transfer Analysis with Convection in Printed Circuit Board



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