

Automated CAE Analysis to Evaluate the Structural Rigidity and Motion Performances of Mechanical Systems

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- ⇒ CAE analysis automation technologies to enable mechanical designers to perform complicated CAE analysis of mechanical motion systems
- ⇒ Technologies to evaluate key performance indices of mechanical motion systems by analyzing complicated CAE results

Client / Market

- Manufacturers of machine tools requiring high stiffness structure
- Manufacturers of high-speed, high-precision motion stages for semiconductor or flat-panel display applications

Necessity of this Technology

- The CAE structural analysis is a widely used technique to evaluate the designs of mechanical systems. However, evaluating the key performances of a complicated mechanical motion system is too complicated for mechanical designers in SMEs.
- To secure reliability of the structural analysis result, connecting elements such as LM blocks, ball screws, servo motors, and encoders should be modeled with appropriate level of details and accuracy, which requires extensive know-hows and empirical data.
- It is necessary to improve the availability of the structural analysis technology by eliminating complex and labor intensive tasks including connecting element creation and 3D geometry simplification.

Technical Differentiation

- Can evaluate the key performances of an entire mechanical motion system, not a single unit or a part.
- Equipped with know-hows and empirical data to realistically model mechanical connecting elements including LM blocks, ball screws, servo motors, and encoders.
- Manual work necessary for CAE structural analysis is minimized with automation technologies.

Excellence of Technology

- A mechanical designer without expertise on CAE analysis can build the analysis model of a complicated mechanical motion system with minimum user input thanks to automation of complex processes of modeling connecting elements, geometry simplification and assembly of finite element models.
- Once the primary structural analysis model is built, the same type of analysis can be repeated in multiple positions automatically to evaluate the position dependent performances.

DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

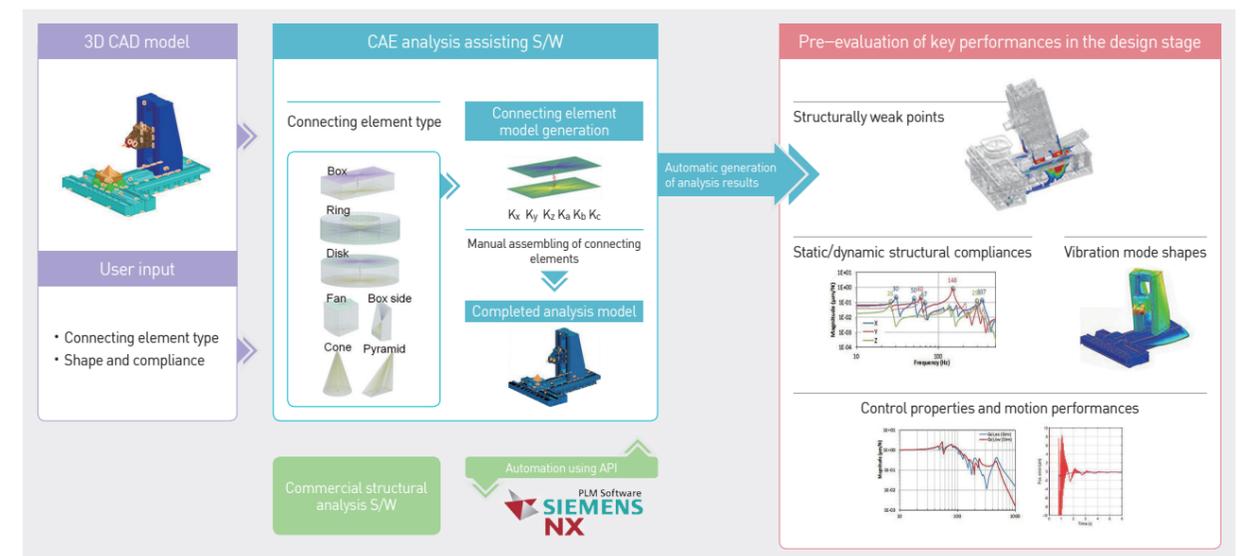
Other



TECHNOLOGY READINESS LEVEL [TRL]

Research, basic explanation | Project concept or idea development | Technology idea verification | Prototype development | Trial product production/evaluation in similar environment | Pilot field demonstration | Development and optimization of commercial model | Commercial product demonstration | Mass production and initial market launch

- The basic structural analysis results are automatically processed into more insightful performance indices, such as structural loop stiffness, gravity induced machine accuracy, and motion performances.



Current Intellectual Property Right Status

PATENT

- Finite Element Analysis Techniques for Machine Tools (KR1729589)
- Vibration Transmission Analysis Method in a Precision Machine (KR1551183)

KNOW-HOW

- Analysis technology on gravity induced motion accuracy using static structural analysis
- Component contribution analysis technology on static/dynamic structural stiffness
- Analysis technology on control and motion performances using structural analysis results