

CAI_DYNAMICS

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Category: Engineering

Software was Developed on 2.1 release of

NeXTSTEP

Brief Description of the Software

CAI_DYNAMICS consists modules of instruction for a basic course in engineering dynamics. In engineering dynamics, the relationships between applied forces and the position, velocity and acceleration of objects are studied. CAI_DYNAMICS consists of interactive displays of kinematic and dynamic problems. These instructional modules were developed so that wide applications of mechanical engineering would be illustrated and lead student from idealized and symbolic representations to more practical and interesting situations. The construction of the software is done in three different types of modules: Particle Dynamics, Static analysis rigid bodies, and Kinematic analysis of rigid bodies.

For each module in the CAI_DYNAMICS, equations of motion were formulated, solved and animated. The motions are accurately described so that the relationship between force and motion is better

understood by the students.

Free body diagrams for each situation where understanding of the nature of forces, which cause motion are displayed. Graphs are displayed for certain parameters to get the idea of distribution of the output parameters over the complete cycle of the motion.

For each application module, help files are provided. The procedure to use each application module is described in one type of help files and the concepts involved in solving the problem is given in advance help files.

Following is the procedure to be followed to run an application module.

- 1) Read the help file for the application by selecting the application name in the "Help Topics" browser in this window. This Help file guides you to run the application and what to look for in the simulation.
- 2) Open an application module using a main menu cell.
- 3) Main application window will open.
- 4) Input the values of different parameters using sliders. The text field next to each slider shows the value of the parameter at that instant.
- 5) Press the "Reset" button to make sure that the effect of input parameters on the geometric representation of the problem is correct.

- 6) Open any another window e.g. graph window, free body diagram window if any.
- 7) Select the "Run" button to start the application module running.
- 8) Watch the type of motion and the output in the form of graph or numbers in the output text fields.
- 9) Change the input parameters and repeat steps up to 7.
- 10) See, what difference, the change in the input parameters made on the type of motion, output values and graph.
- 11) Try to answer the questions stated in the help file for the application module.
- 12) To understand the concepts used in solving the problem, read "Advance Help File".