ADORE Update Version 6.00

Release Date: April 15, 2014

ADORE 6.00 is an enhancement to earlier version 5.80. All temporary fixes issued in version 5.81 are now permanent in version 6.00. The following is a description of specific enhancements:

Code Enhancements

Fatigue Life Modeling

Further development of life models continued after version 5.80. The life equations were further generalized to developed discrete materials and geometrical parameters. Thus new life equation for the Lundberg-Palmgren (L-P) model was developed and incorporated in ADORE. The Zaretsky model was also further generalized and presented as a new Gupta-Zaretsky (G-Z) life equation and incorported in ADORE 6.00. These new models provide arbitrary variation in material properties to better estimate life of bearings with modern materials including ceramics. Also, by applying the life equations to individual contacts, both the newly developed equations provide greatly improved life estimates for hybrid bearings.

Thermal Modeling

 The thermal modeling routines were extended to provide bearing temperature field estimates with circulating coolant or lubricants. Either the housing or shaft temperatures may be used as reference while computing temperatures throughout the bearing. Also upon startup the coolant exit temperature is set equal to the inlet temperature. As the heat generation builds up the temperatures increase and reach a steady-state as the dynamic simulation continues. Experimental validation of these computed fields is presently underway.

Expansion of Materials Database

Several new materials were added to the database within ADORE. Some of the materials properties data provide variation as a function of temperature. Such property variations were installed in the ADORE database. Although not used presently, the temperature variation of materials properties will be greatly useful with anticipated enhancement of thermal modeling in future.

Traction Modeling

A new variation of the hypothetical traction is introduced in version 6.00. The hypothetical traction-slip relation may now be prescribed with defined slope at zero slip and an asymptotic maximum traction coefficient at infinite slip. Such a behvior is quite similar to visco-elastic traction models. Thus this new variation of the hypothetical model will provide quick evaluation of visco-elastic effects.

ADORE User Manual

ADORE user manual has been appropriately modified to include documentation for expanded materials database and new variables introduced in version 6.00 as a result above code enhancement. The new version of the manual is included on the code distribution disk.

ADORE Input, Plot and Animation Facilities

The input facility AdrInput was appropriately modified to provide new data as required by the new version 6.00. Note that older data sets may not work with the new version 6.00. However, the old input datasets may be opened with new AdrInput facility to convert the data files for use with ADORE 6.00.

There are no modifications to the plot (AdrPlot) and animation facilities (AGORE).

ADORE Print Output

Modifications to ADORE print output were quite minor. The input data section of the print output was modified to document new input data as required in version 6.00.

Test Cases

As usual the input data, print output and all plot data sets are included in these subdirectories in the program media. These examples must be run and checked after installation of the program. All outputs, at least at step 0, must match against the supplied output.

In addition to the new output in the life modeling section, the computed lives may be slightly different from those computed in earlier versions of ADORE. This is primarily due to newer values of model coefficients which provide better correlation with experimental data.

Program File Contents:

As usual program updates are distributed on a CD in normal data format. The files may be easily extracted from this disk on any computer system and then transferred to appropriate system for which ADORE is licensed for.

The media contains the following three subdirectories and a readMe.txt file which provides latest update information and instructions for quick installation on the Windows machine:

Disk1

Update600.pdf:

A pdf file containing notes of the latest updates (this file).

adoreInput.txt:

A text file containing details of ADORE input data.

adoreManual.pdf:

ADORE user's manual containing detailed instructions for program installation and use.

Ball:

Subdirectory containing ball bearing test case

Roller:

Subdirectory containing roller bearing test case

TaperedRoller:

Subdirectory containing tapered roller bearing test case

AdrxExamples

Subdirectory containing few of the user program able examples via subroutine ADRX1.

Disk2

*.f files:

ADORE FORTRAN-90/95 source files
Makefile for easy installation of the code on a Wndows 7 machine.

Disk3

setup.bat:

Setup batch file to compile adrInput, adrPlot and AGORE on Windows system.

adrInput.bat:

Batch file to execute adrInput.

adrPlot.bat:

Batch file to execute adrPlot.

agore.bat:

Batch file to execute the graphics animation facility, AGORE.

Java:

Subdirectory containing all Java source files.

Progam Installation

Quick installation steps are outlined in the readMe.txt file supplied on the program disk. More detailed installation are included in the users manual.

ADORE Installation

A Makefile is provided in Disk2 directory for easy installation of ADORE. The compiler commands are compatible with the Lahey Fortran compiler. In case of other compilers the Makefile may be simply edited before using it with the nmake command on the Windows operating system.

Installation of Java facilities adrInput, adrPlot and Agore

Edit the setup.bat file in Disk3 subdirectory to correct the paths to all source files and the Java Development Kit. Execute the updated setup file to compile and install these facilities.

The setup files for the three applications may then be edited to update the paths and installed in appropriate directory compatible with the environmental variables which provide access to all executables.

Contact Information

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