
PZFlex v2.3 Updates

Overview

This year has seen considerable changes to all aspects of PZFlex. FlexLAB has undergone major functionality upgrades along with several new wizards and tools, and many new core calculation capabilities as well. All users should see significant advances appropriate for their needs.

New Tools

- **Additional Wizards**

Following the successful introduction of PZFlex wizards, we have introduced new toolkits for the transducer designer, as well as improving the existing functions.

This year we have introduced:

- curved ceramics and piezocomposites
- piezocomposite arrays
- 4 additional Tonpilz devices
- shear-poled 3D ceramic block
- piezoceramic tubes
- non-square pillar 1-2 piezocomposites

In addition to this, new wizard features include:

- access to user-defined materials
- user-defined fluid mediums
- user-defined drive sources
- user-defined matching circuits
- multi-processor support

We have also optimised the Ui's for lower resolution monitors

- **Insight Visualisation Tool**

This year we have spent considerable time and effort to improve the Insight data viewer introduced last year. New features include:

- function calculator to allow manipulation of data
- improved markers
- improved plotting (multi-axis)
- curve exporting to ASCII and Flex histories
- curve selecting on plotting canvas

- **Dispersion Curve Tool**

A simple GUI that allows the designer to determine the Lamb wave curves for a simple plate.

- **1D Modelling Toolkit (beta)**

Introducing simplified 1D models calculated using PZFlex's powerful and accurate solvers and an intuitive GUI for rapid analyses of basic transducer designs.

- **FlexLAB improvements**

In order to allow our users to access the higher memory facilitated by 64bit Operating Systems for our SolidWorks importer we have completed a 64bit version of the design environment. Improvements have also been made to the search/replace functions, batch controller and default settings.

New Code Features

- **Acoustic Radiation Force** - Full 3d radiation force can be calculated from an acoustic simulation and used in a second force calculation. CALC ARST will calculate and store up to the full 6 stress arrays depending on acoustic wave and material properties
- **Shock heating** - Artificial viscosity may be applied at the same as any regular damping model, allowing for implementation of shock heating effects in high pressure and focused ultrasound applications
- **Dielectric loss** - Material property additions will allow simple calculation of dielectric and piezoelectric loss based upon the energy integral arrays, for use in thermal calculations
- **Curving models** - GEOM BEND can be used to mold a Cartesian model around a cylindrical or spherical surface
- **Multiple Functions** - Users may define any number of drive histories with FUNC NAME
- **Model Copy Commands** - A number of commands to quickly copy xyz locations, ijk keypoints and materials have been added as SITE REGNDUPL, symb #keyindx, #keycopy, and GEOM KEYPNT
- **Volume calculation** - SYMB #GET LEVELVOL will calculate the volume of any region in a model of greater than a specified value

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New Code Features (cont.)

- **Plot Material Properties** – CALC MATPROP now calculates elemental sized arrays of requested material parameters
- **Radiation impedance** – additional arrays are stored by CALC BWORK to allow simple calculation of radiation impedance in a model

Improvements to Existing Features

- **Curved Pressure Load Lines** – Spherical and Cylindrical loading options have now been included under PLOD
- **DATA MIRR** – Can now mirror the data in-place in the array.
- **Circuit Current** – a CRTI array now stores current in electric circuits
- **Data interpolation** – DATA REMAP will allow mapping of data from one grid to another, including from 2D axisymmetric to 3D
- **SHAP CNVRT** – will convert velocity shape data to equivalent displacement of acceleration data
- **Material copy** – MATR COPY will now copy a material definition to a new name
- **Rigid definition** – RIGD surfaces may now be defined by material
- **SITE TABL** – material tables may now be exported
- **Material change** – SITE SWAP can now swap materials in an existing model
- **Thermal Models** – VOID materials may now exist in a thermal model

- **Multiple EXEC RINGDOWN** – This command may now be issued multiple times in a single calculation
- **WNDO** – AUTO feature now chooses optimum calculation window size for simple models that do not use BOND or GLUE
- **Iterative solver** – The DCGD solver now operates on multiple electric window simulations

Bug Fixes

- **Extrapolation** – an error in co-ordinate calculation in 2D extrapolation has been fixed
- **Multi-processing** – The MP command has been corrected to work with restart files

For further information:

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