ATA ENGINEERING, INC.



Vibrata Revision History

This document describes the new features and bug fixes for each release of Vibrata.

Version 5.3.1

Enhancements

- Supports MATLAB R2025a through R2026b.
- Requires MATLAB Runtime R2025b
- Change XY result InterpolationType to LinLin for FastRMS solves so the RMS calculation matches the contour results
- Implement an experimental new feature to reduce the number of frequency lines used in a Frequency or Random solve without sacrificing accuracy

Version 5.3.0

Enhancements

- Supports MATLAB R2023b through R2026a. It does not support MATLAB 2024a due to a bug in MATLAB. May work with future versions, at user's own risk.
- Requires MATLAB Runtime R2025b
- Support dark theme
- Add support for Nastran solves that use OMODES to select a subset of modes

Bug Fixes

- Fix bug where sometimes the VRA5 file would become corrupt after it was created if Vibrata unexpectedly closed
- Fix GUI crash when loading an OP2 where all of the rigid body mode frequencies are exactly zero

Version 5.2.3

Enhancements

- Supports Femap 11.3x through 2512. May work with future versions; use at your own risk.
- Added workflow in the User Guide demonstrating a transient nonlinear displacement limiting example.
- Update the Force Limiting GUI to clean up formatting in newer MATLAB

Bug Fixes

- Fix bug defining CSD functions where the GUI would incorrectly label them as Scale functions, causing an error when reloading the event file
- Fix bug defining phase and time lag CSDs which caused incorrect phase calculation for non-zero lags

Version 5.2.2

Enhancements

- Supports Femap 11.3x through 2506. May work with future versions, at user's own risk.
- Supports MATLAB R2023a through R2025b. It does not support MATLAB 2024a due to a bug in MATLAB. May work with future versions, at user's own risk.
- New Post Processing example function vraPostResponseSummation that sums XY response output for the Response Spectrum solver, allowing you to compute section loads.
- Overhauled the New Function GUI and improved performance pasting data into the function definition table.
- Allow pasting data from a spreadsheet into the function Edit GUI in Function Manager.

Bug Fixes

- Fix bug where reaction forces were calculated incorrectly for base excitation solves where the base node was defined with a local coordinate system.
- Fix TIER#4228, 4313, 4369, 4382, 4400, 4404, and 4406

Version 5.2.1

Enhancements

- Vibrata now registers itself in the Windows registry when it launches, eliminating the need for the installer to register these components
- More robust checking and more informative error messages when the component registration fails

Bug Fixes

- Fix TIER#4206

Version 5.2.0

Enhancements

- Supports Femap 11.3x through 2412.x. May work with future versions, at user's own risk.
- Supports MATLAB R2023a through R2024b. It does not support MATLAB 2024a due to a bug in MATLAB. May work with future versions, at user's own risk.
- Provide an alter for MSC Nastran to generate the constraint mode datablocks needed by Vibrata. This alter has been tested with MSC Nastran 2021.3 through 2024.1.
- The base vs force-limited acceleration plot generated by the Force Limiting GUI now has the ability to change display units through a plot menu.
- The transient solver input force processing performance has been improved.
- Section loads can now be calculated for Node XY output as an invariant output. The frequency, transient, and random solvers are supported.

Bug Fixes

- Fix bug where the forcing function scale factor was not being applied for Response Spectrum analysis.
- The issue of the XY plotting GUI sometimes not sizing itself correctly has been resolved.
- Fix TIER#2948, 4289, 4295, 4346, 4367, 4375, and 4376

Version 5.1.2

Bug Fixes

- Fix performance issue writing results to Femap.

Version 5.1.1

Bug Fixes

- Fixed an issue where reusing a .vra5 database from an earlier version would provide incorrect results under base excitation.

Version 5.1.0

Enhancements

- Supports Femap 11.3x through 2401.x. May work with future versions, at user's own risk.
- Supports MATLAB R2021b through R2023b. It does not support MATLAB 2024a due to a bug in MATLAB. May work with future versions, at user's own risk.
- Overhaul of FastRMS solver with a different algorithm. Now supports the same random analysis options as the standard method. Significantly faster von Mises invariant calculations.
- Significant random solver memory usage and stability improvements with both standard and FastRMS algorithms.

Bug Fixes

- Fixed TIER#4286, 4287, 4294, 4302, and 4310.

Version 5.0.1

Enhancements

- Supports Femap 11.3x through 2301.x
- Supports MATLAB R2020a to R2023a.
- Supports silent installs.

Bug Fixes

- Fixed issue where CBEAM stress maximum and minimum envelopes were not being computed in the transient solver.
- Fixed issues importing some 64-bit OP2 files.

Version 5.0.0

Enhancements

- Supports Femap 11.3.x through 2022.2.x.

- Supports MATLAB R2020a to R2022b.
- Requires MATLAB MCR v9.11 (R2021b).
- The EVT file format has been overhauled.
    - The damping definition in the GUI and EVT file is now handled differently than in previous versions. It is now clearer what damping values are being applied.
    - If an OP2 file has damping matrices, they will now be automatically applied during EVT creation.
    - Zero-crossing output in the EVT file has been renamed from ZXR to ZUXR to clarify that Vibrata calculates the zero up-crossing rate. The documentation has also been clarified.
- Response Spectrum solver XY output is now signed and no longer returns the absolute value of the response.
- Examples are now enhanced to use residual vectors.

Bug Fixes

- Fixed issue in the nonlinear transient solver where the negative *Krestore* solution (deadband) restoring force was applied in the opposite direction, causing the deadband to simulate incorrectly.
- Fixed TIER#1208, 2810, 4207, 4210, 4211, 4227, 4234, 4236, 4242, 4246, 4248, 4252, and 4258.

Version 4.0.3

Bug Fixes

- Fixed bug in the random solver that caused incorrect results when multiple correlated inputs were used. Single-input and uncorrelated multi-input analyses were not affected.
- Fixed bug in Post Processing function identification that caused the Info file to not be found if it was in a custom directory specified by VIBRATA_POST_PATH.
- Fixed TIER#4234.

Version 4.0.2

Enhancements

- Supports Femap 11.3.x through 2022.2.x.
- Supports MATLAB R2018b to R2022a.

Bug Fixes

- Numerous miscellaneous bugfixes
- Fixed TIER#4208 and 4214.

Version 4.0.1

Enhancements

- The Force Limiting GUI now displays slope guidance on the figure. You can now plot the apparent mass directly from the main GUI.
- Added new postprocessing function to display modal responses.

Bug Fixes

- Fixed TIER#3829, 4134, 4135, 4144, and 4169.

Version 4.0.0

Enhancements

- Supports MATLAB R2018b to R2021b.
- Supports Femap 11.3.x, 11.4.x, 12.0.x, 2019.1.x, 2020.x, 2021.1.x, and 2021.2.x.
- You can now create your own custom nonlinear forcing functions to use in the transient solver.
- A new Post Processing tab lets you run custom postprocessing functionalities after a solve. You can use the functionalities supplied with Vibrata or create your own.
- Added support for computing composite failure indices.

Bug Fixes

- Fixed issue calculating modal effective mass for models where the translational mass is not the same in each direction.
- Fixed TIER#3980, 3982 3984, 3999, 4049, and 4064.

Version 3.4.1.

Enhancements

- Supports MATLAB R2018b to R2021a.

- Supports Femap 11.3.x, 11.4.x, 12.0.x, 2019.1.x, 2020.x, 2021.1.x, and 2021.2.x.
- Added sine force limiting to the Force Limiting GUI.

Bug Fixes

- Fixed TIER#3688, 3689, 3895, and 3907.

Version 3.4.0.

Enhancements

- Supports MATLAB R2018b to R2021a.
- Supports Femap 11.3.x, 11.4.x, 12.0.x, 2019.1.x, 2020.x, and 2021.1.x.
- VRA5 file creation now takes less memory.
- VRA5 mode shape coefficients are now stored in single precision if the OP2 is single precision.
- Grid point forces can now be requested as CSD output for the random solver.
- Excitations can now be edited.

Bug Fixes

- Fixed TIER#2542.

Version 3.2.1.

Enhancements

- Supports MATLAB R2018b to R2020b.
- Supports Femap 11.3.x, 11.4.x, 12.0.x, 2019.1.x, 2020.x, and 2021.1.x.
- Provides better feedback when a displacement quantity request cannot be completed because the shape coefficients do not exist.
- Function Manager now displays a separate dialog when the evaluated math expression generates output text. This text is also displayed if an error occurs.
- Improves performance and memory when generating the VRA5 file.

Bug Fixes

- Fixed TIER#3968.

Version 3.2.0.

Enhancements

- Supports MATLAB R2018b to R2020b.
- Supports Femap 11.3.x, 11.4.x, 12.0.x, 2019.1.x, 2020.1.x, and 2020.2.x.

- This version of Vibrata requires MCR 9.5.
- Adds support for shell and solid ply laminate results.
- Captures Vibrata crash messages in an error log file that is written to the user's home directory.
- Provides updated contour output request interval graphical interface that has been modified to improve clarity and ease of use.
- Adds option to display point force and base excitation input locations with arrows on the FEM.

Bug Fixes

- Fixed TIER#180, 194, 879, 2463, 2793, 3373, 3426, 3547, and 3685.

Version 3.0.2.

Enhancements

- Supports MATLAB R2016b to R2020a.
- Supports Femap 11.3.x, 11.4.x, 12.0.x, 2019.1.x, and 2020.1.x.
- Updated damping for when event files are read:
    - When an event file is imported, the damping schedule is reapplied rather than the damping values specified in the mode settings table being used. Reapplying the schedule allows you to apply modified damping schedules and/or changed damping matrices but has the side effect of overriding any user-specified damping values entered directly into the modal settings table. This also means that, in batch mode, you cannot reapply those direct damping edits.
- Reduced memory usage (sometimes greatly) when processing stress, strain, and force results during VRA5 file creation.

Bug Fixes

- Fixed bug converting OEF1 results from OP2 to VRA5 when a static subcase exists and both forces and stress resultants are present in OEF1.
- Fixed TIER#3408 and 3421.

Version 3.0.1.

Enhancements

- Supports Femap 11.3.x, 11.4.x, 12.0.x, 2019.1.x, and 2020.1.x.

Bug Fixes

- Fixed bug in labeling CSD output from random analysis (Name and ReferenceCoord/ResponseCoord were not consistent).
- Fixed bug where FEMs with a single loadset would not be able to select it in the Excitations tab.
- Fixed bug importing reaction force constraint modes into the .vra5 database.
- Fixed bug selecting min/max/peak in a transient solution.
- Fixed TIER#3363.

Version 3.0.0.

Enhancements

- Supports MATLAB R2016b to R2019b.
- Supports Femap 11.3.x, 11.4.x, 12.0.x, and 2019.1.x.
- Uses a Vibrata-specific HDF5 database to import mode shapes for the solves rather than requesting them from Femap.
- **Solver** enhancements:
    - Added XY output to the Response Spectrum solver. The XY output contains the responses of each mode. The X-axis is mode number and the Y-axis is the response. This output is helpful for determining how the modes contribute to the total response.
    - The Transient solver now supports computing the maximum and minimum combined axial+bending stress and strain envelopes for CBAR elements (SBENV and EBENV).

Bug Fixes

- Compute cross-spectral densities when requested (previously you could request them, but only power spectral densities were calculated).
- Fixed TIER#2995, 3234, 3252, 3268, 3320, and 3348.

Version 2.2.2.

Enhancements

- Support MATLAB R2016b to R2019a.
- More gracefully handles the case where the solver server (MATLAB or the MCR) crashes during a solve. Users should no longer need to manually kill processes.
- **Solver** enhancements:
    - Enhanced the naming of the contour output set to be more descriptive.

- Reduced memory usage for processing of von Mises, principal, and hydrostatic output for shell elements.

Bug Fixes

- Fixed TIER#2957.
- Fixed bug displaying user-defined math methods in the Function Manager.
- Fixed incorrect calculation of hydrostatic (mean) stress for shell elements.
- Fixed bug in the random solver handling residual vectors with multiple inputs.
- Minor bug fixes and enhancements.

Version 2.2.1.

Bug Fixes

- Minor bug fixes and enhancements, mainly in the GUI.

Version 2.2.0.

Enhancements

- Supports MATLAB R2016b to R2018b.
- Supports Femap 11.3.x, 11.4.x, and 12.0.x.
- **Solver** enhancements:
  - Incorporated nonlinear force modeling in the transient solver.
- **Function Manager** enhancements:
  - Supports additional syntax: empty matrix ([]) and vectors (e.g., 1:10 or 0.01:0.01:0.05).
  - Imports Nastran TABLED1 and TABRND1 data from bulk data or Output2 and can export to TABLED1 format.
  - Added zero up-crossing rate to the available math operations in Statistics.
- **X-Y Result Plot** (UIPLOT) enhancements:
  - Can display zero up-crossing rate in the statistics legend in UIPLOT.
  - Exports functions to Nastran TABLED1 format.
- **FastRMS** enhancements:
  - Enhancements to fitting algorithm to improve performance and fit quality.
  - Explicitly supports white-noise input spectra.

Bug Fixes

- Fixed TIER#1668, 2647, 2808, 2895, and 2902.
- Fixed bug where the *.vra_q* file did not contain the modal response matrices if the matrices were very large.
- Correctly calculates von Mises strain for all solvers.
- Other minor bug fixes and enhancements.

Version 2.0.1.

Enhancements

- Supports MATLAB R2015a to R2017b.

Bug Fixes

- Fixed TIER#1241, 1285, 1325, 2404, 2428, 2472, 2528, 2541, and 2680.
- Handles OP2 files generated in NX Nastran 11.0 and higher that utilize an effective mass threshold (the OP2 contents changed from previous Nastran versions).
- Fixed bug in the random solver for multiple inputs with CSDs when the PSD node locations specified in the CSD matrix were not specified in the order of increasing node IDs.
- Other minor bug fixes and enhancements.

Version 2.0.0.

Enhancements

- Vibrata now by default runs an MCR-based solver based on MATLAB (using the MATLAB Component Runtime version 9.1) rather than running MATLAB directly. This eliminates MATLAB as a requirement to run Vibrata. However, Vibrata can still use MATLAB as its solver (and needs to if you are using custom solvers), using the appropriate command-line argument.
- Supports MATLAB R2015a to R2017a.
- Added support for Femap 11.4.x. This version of Vibrata also supports Femap 11.3.x.
- Added new modal filtering GUI to apply a modal filter to time histories.
- Several documentation enhancements to clarify various parts of Vibrata operation.
- Robustly handles large (>2 Gb) *.vra_xyout* files.
- Added GUI to assist in setting up Nastran decks from Femap.

Bug Fixes

- Fixed TIER#1241, 1285, 1325, 2404, 2428, 2472, 2528, and 2541.
- For running in batch mode, the solver now finds EVT and EVL files that utilize relative paths. The files are assumed to be relative to the current working directory.
- Other minor bug fixes and enhancements.

Version 1.6.5.

Enhancements

- Added documentation for the Force Limiting GUI introduced in version 1.6.3.
- Added C^2 scaling button in the Force Limiting GUI to scale C^2 so that the notches do not exceed the cutoff limit.
- Clarified bar/beam stress output.

Bug Fixes

- Fixed TIER#2398, 2399, and 2411.
- Fixed bug that caused Vibrata to be unable to find modes on occasion if more than one MODFEM was open in the Femap session.
- Other minor bug fixes and enhancements.

Version 1.6.4.

Enhancements

- For frequency and random solves, added the input forcing function breakpoint frequencies to the solve frequencies for unevenly spaced input functions.
- Added constant slope and cumulative rolloff options to the Input Shaping force-limited input GUI, and allows the user to choose any combination of notching.
- Added support for bending, membrane, and plane strain shell elements.

Bug Fixes

- Vibrata generated incorrect results when processing base excitation contour Total Velocity and Total Acceleration output when the base node was defined with a local displacement coordinate system.
- Fixed TIER#278.
- Other minor bug fixes and enhancements.

Version 1.6.3.

Enhancements

- Added GUI to Function Manager under Input Shaping for producing force-limited (notched) input acceleration PSDs.
- Added RMS output type for Contour output for Transient solutions.
- Improved performance of multiple individual Node/Element XY requests of the same type.

Bug Fixes

- Fixed bug where sometimes previously generated XY results were overwritten if XY results had been deleted and new requests subsequently added.
- Fixed TIER#2349.
- Other minor bug fixes and enhancements.

Version 1.6.2.

Enhancements

- Supports MATLAB R2014b to R2016b.

Bug Fixes

- Fixed TIER#2214.
- Other minor bug fixes and enhancements.

Version 1.6.1.

Enhancements

- Updated examples in user guide.

Bug Fixes

- Fixed TIER#2185, 2190, and 2197.
- Other minor bug fixes and enhancements.

Version 1.6.0.

Enhancements

- Supports Femap 11.3.x and MATLAB R2014b to R2016a.
- Removes support for 32-bit Windows.
- Reduced memory usage in contour output processing when the output request has more than one location (e.g., element centroid and nodes).
- Improved frequency layout for X-Y results by including more points between modes and the start and end ranges.

Bug Fixes

- Fixed TIER#2008.
- Fixed bug processing velocity and displacement base excitation inputs for FastRMS.
- Other minor bug fixes and enhancements.

Version 1.4.0.

Enhancements

- Supports Femap 11.2.x.
- Warns the user in the case of a transient solution where contour outputs request a summarized quantity such as Peak and the output time points do not encompass all the time output points.

Bug Fixes

- Fixed TIER#1666 and 1747.
- Corrected handling of coupled damping and highly damped modes when residual vectors are present.
- Other minor bug fixes and enhancements.

Version 1.2.1.

Enhancements

- Handles Nastran models that discard modes using effective mass threshold.
- Improved import performance of damping matrix from Output2 files.
- Cleaned up XY output record names to be more concise.
- Changed beam torque mnemonic to BTx from TQx.

Bug Fixes

- Fixed TIER#1667.
- Other minor bug fixes and enhancements.

Version 1.2.0.

Enhancements

- Supports Femap 11.0.x and 11.1.x.

Bug Fixes

- Other minor bug fixes and enhancements.

Version 1.0.7.

Enhancements

- Officially supports Windows 7.
- Supports MATLAB R2011b through R2014a.
- Allows von Mises output for Response Spectrum solver.
- Modified display of Response Spectrum input location to clarify the solver's operation.
- New button on the Modal Settings tab to display the cumulative effective mass.
- New button on the Modal Settings tab to write modal settings to a CSV file.
- Added support for SPCFORCE results.

Bug Fixes

- Fixed TIER# 1187, 1211, 1231, 1232, 1235, 1237, 1238, 1239, 1243, 1244, 1269, 1284, 1321, 1342, 1345, 1349, 1388, 1389.
- Fixed coordinate system issues with base excitation, and update the user manual to clarify coordinate systems in Vibrata.
- CBEAM and CBEND elements supported for base excitation.
- Other minor bug fixes and enhancements.

Version 1.0.6.

Enhancements

- Allows user to select whether to use FastRMS in the Random solver.

Bug Fixes

- Fixed TIER# 885, 1187, 1216.
- Other minor bug fixes and enhancements.

Version 1.0.5.

Bug Fixes

- Fixed TIER#1189.
- Fixed bug where RMS von Mises stresses were not calculated correctly when using the regular solver for random analysis. This was introduced in 1.0.4 and did not affect FastRMS results.
- Other minor bug fixes and enhancements.

Version 1.0.4.

Enhancements

- Significant performance improvement to von Mises stress calculation for random analysis.
- Added toggle to point force excitation inputs to specify that the inputs are defined in the nodal displacement coordinate system.
- Added toggle to Node XY quantity requests to specify that the outputs should be returned in the nodal displacement coordinate system rather than the basic coordinate system.

Bug Fixes

- Fixed TIER#1032, 1099.
- Fixed bug where solid element RMS stresses were not calculated correctly when the FastRMS solver was used for random analysis.
- Fixed bug in statistics display in XY plotting when switching units.
- Other minor bug fixes and enhancements.

Version 1.0.3.

Bug Fixes

- Fixed bug processing constraint modes when model includes both shells and solids.
- Other minor bug fixes and enhancements.

Version 1.0.2.

Enhancements

- Allows user to enter function Name and Interpolation Type directly on new function creation form, rather than having to go into Attributes.

Bug Fixes

- Fixed TIER#940.
- Other minor bug fixes and enhancements.

Version 1.0.1.

Enhancements

- Significant performance improvement reading mode shapes from models with multiple element types.

Bug Fixes

- Fixed bug in FastRMS solver where it would error when solving for stress contours.

Version 1.0.0.

- Initial release.