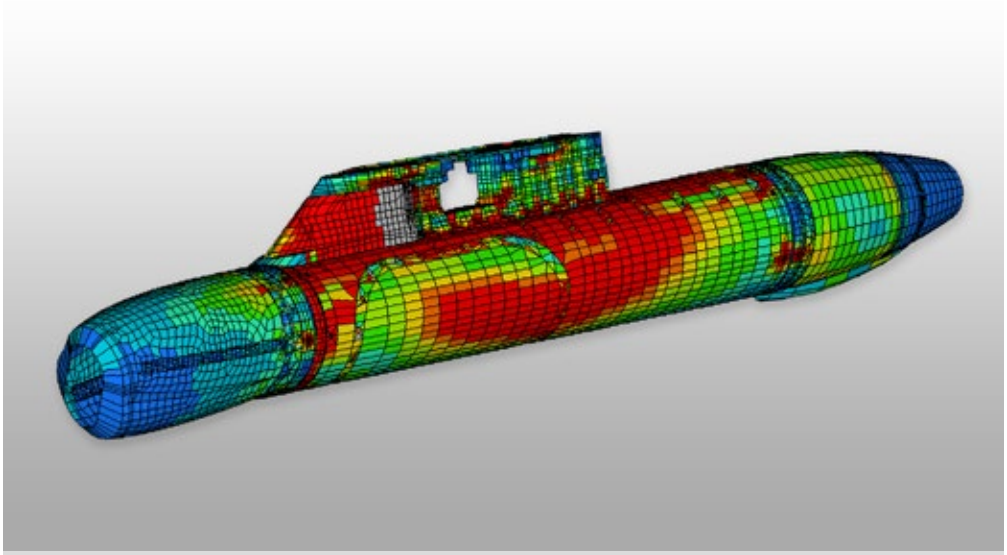
Patran 2017

For Multidisciplinary Analysis



MSC Patran is a multidisciplinary pre/post-processing tool that supports multiple solvers including MSC Nastran, Marc and Dytran.

Patran is designed to create simulation models for a wide variety of analysis types including linear statics, buckling, normal modes, nonlinear, dynamics, thermal and fatigue.

Engineers can import geometry from major CAD formats to create new FEA models from scratch, or use the geometry and meshing tools inside Patran to manipulate and modify their existing models.

MSC Software

New Functionalities and Major Enhancements

Enhanced User Interface

The user interface of Patran 2017 has been enhanced to improve user productivity by providing a modern framework for design and graphics. The interactive GUI offers identical appearances and functionalities across all supported platforms (i.e. Windows and Linux).

New Features for productivity improvements:

- XY-Plot enhancements to increase productivity
- Efficient and interactive spreadsheet format for data entry
- Quick zoom-in/zoom-out feature with mouse wheel control. (Available for both graphics viewport and XY-Plot windows.

HDF5 Support

Patran 2017 post-processing capabilities have been enhanced to support Nastran HDF5 (.h5) result files. HDF5 is a database that stores and manages MSC Nastran input and output data in a hierarchical structure format. Some benefits of using HDF5 files for post-processing of MSC Nastran results include:

- HDF5 datasets have higher precision and higher accuracy of results
- File sizes with HDF5 output are much smaller compared to op2, xdb and MASTER
- Attaching HDF5 result files is far faster than xdb or op2
- Easily access the HDF5 output using common programming languages such as Python, C++ and Java.

	Compressed HDF5	New OP2
Attach time	4.5 sec	4 min
File size	13.5 GB	17.3 GB

**H5 file sizes are much smaller than older post processing formats. Importing h5 results is much faster.*

HDF5 output supports a wide range of results through most MSC Nastran solutions (sol 101, 103, 105, 107-112 and 400). Some of the outputs include:

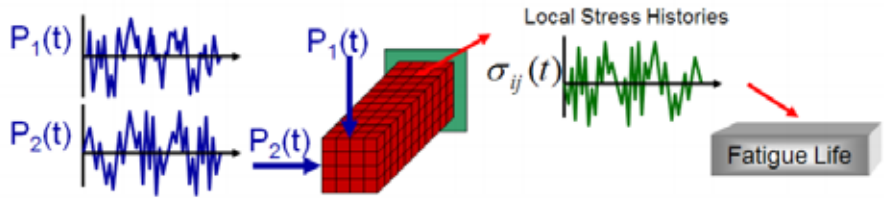
1. Acoustic Results (New)
2. Fatigue life and damage results (NEW)
3. Contact results such as contact status, contact forces
4. Nonlinear output defined by NLOUT

Integration with MSC Nastran Embedded Vibration Fatigue (NEVF)

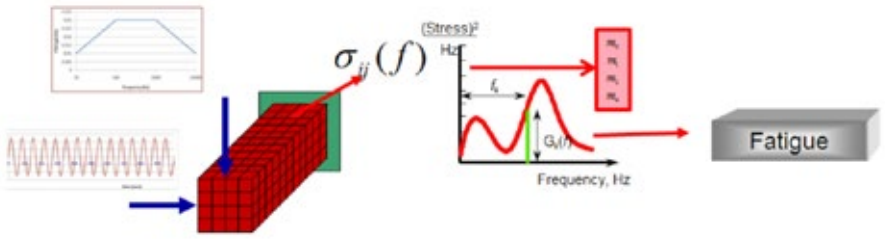
With the 2017 release, Patran capabilities have been extended to support creation and post-processing of Vibration Fatigue analysis models within the MSC Nastran Preference.

NEVF is an integrated module inside MSC Nastran that allows engineers to perform vibration based fatigue simulations in the frequency domain. With this innovative and computationally efficient procedure, engineers can now obtain fatigue results in orders of magnitude faster.
For more information visit http://www.mscsoftware.com/product/msc-nastran-embedded-vibration-fatigue).

Traditional Fatigue Analysis Procedure in the Time Domain

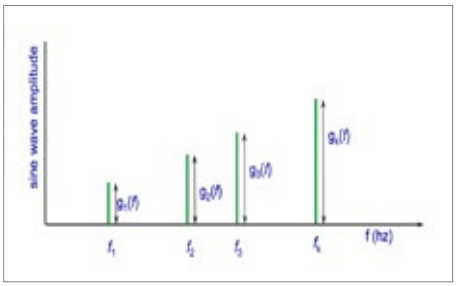


Vibration Fatigue Analysis Procedure in the Frequency Domain

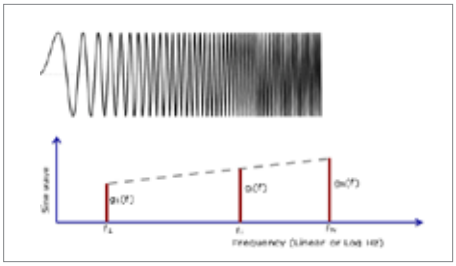


The following NEVF capabilities are now supported with Patran 2017:

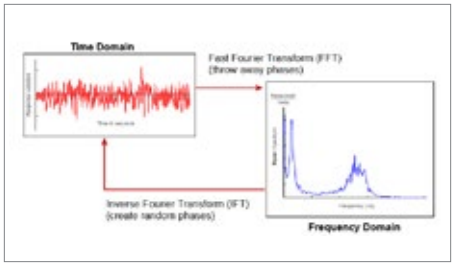
- Support for various types of dynamic loading – Deterministic, Random, Sine Sweep and other types of loading can easily be defined from Patran
- Time to PSD conversion utility – Direct conversion of time history data into power spectral density (PSD) functions, without manual conversion
- Stress life (S-N) and Strain life (e-N) solvers – The basic types of fatigue analysis capabilities available in frequency domain include stress-life (S-N), and strain-life (e-N),
- Post-processing Support for Design Optimization of Fatigue Results – Fatigue responses can be used as design objectives inside MSC Nastran optimization module. Later, these responses can be plotted in Patran 2017
- Post-processing of Fatigue and Random Response results – In addition to plotting fatigue life and damage plots, Patran 2017 provides several outputs like stress PSDs



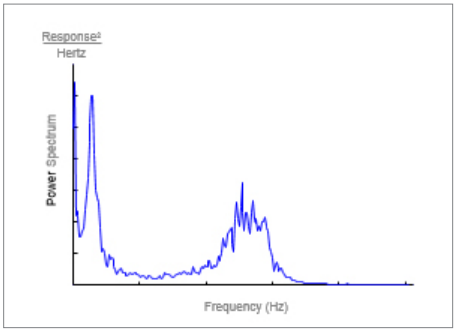
Deterministic Loading



Sine Sweep



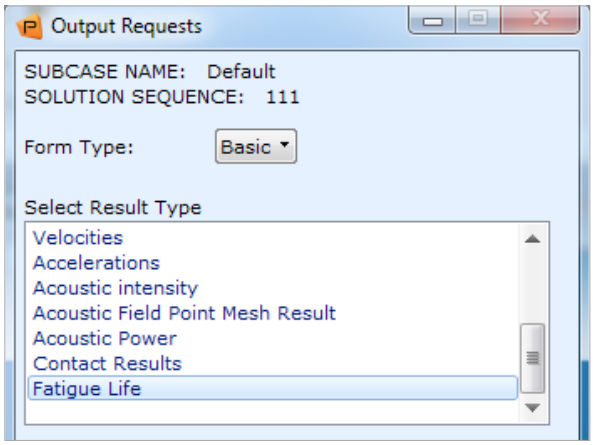
Time2PSD Convertor Utility



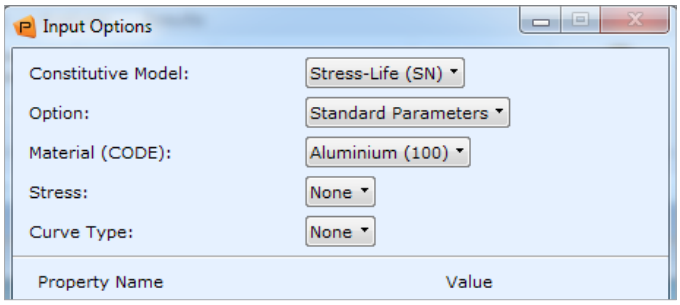
PSD Loading

To Access this Functionality Inside Patran, users need to have a ready and working Frequency Response Model (SOL 111 and SOL 108) and then follow these Simple Steps:

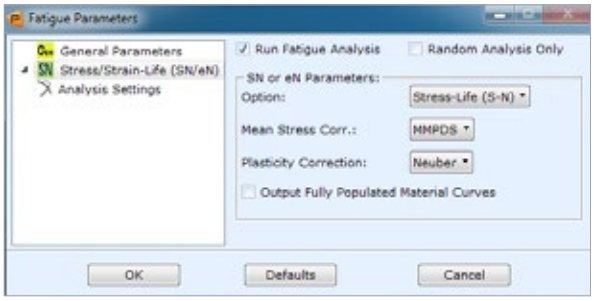
1 Turn on the FATIGUE Output Request



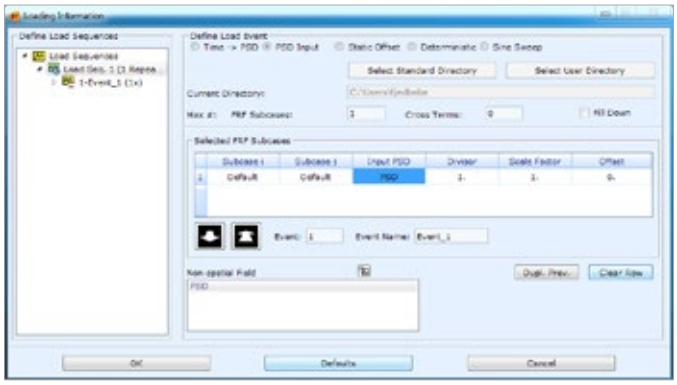
2 Define Fatigue Material Properties



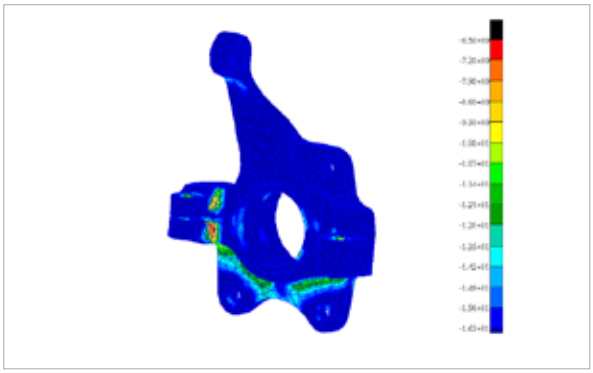
3 Define Additional Fatigue Parameters



4 Define the Fatigue Loading Sequences & Events



5 Post Process Fatigue Results



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