

# The Focus



A Publication for ANSYS Users

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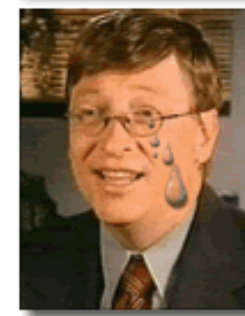
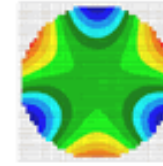
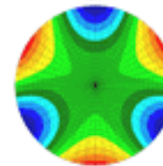
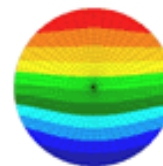
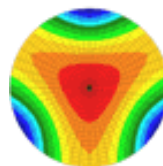
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## SigFit New Optics Connection Improves ANSYS s Vision

by [Eric Miller](#)

### The Cool Add-on s for ANSYS Series

The other day, a user mentioned a specific feature that ANSYS did not contain. In looking for a solution, I noticed that there are a lot of cool little programs out there that people are selling that don t get a lot of press. So, since Rod is always e-mailing me about new articles, it seemed *The Focus* would be a good place to highlight a few. The first one is a nifty tool for the optics world. Truth is, the last time I even vaguely understood this sort of thing was when I dated an optometry student in college and a hot date consisted of helping her cram for finals... but I digress. Since we have a couple of users who do telescopes and fiber optics, it seemed like a good place to start.

### SigFit



ANSYS users who work in the world of optics now have a new way to talk to their optical simulation tools. [Sigmadyne](#), a consulting company in upstate New York, has a tool called SIGFIT that now interfaces between ANSYS and CODE-5 or ZEMAX. The program allows you to perform sequential mechanical-optical solutions by converting deformed ANSYS geometry into information the optics codes

can use.

The current version supports Zernike Polynomial fitting, Adaptive Optics (actuator controlled) and Harmonic/Random/Transient dynamic analysis under an easy to use Graphical User Interface. The plan for sometime this year is to add thermal effects and stress birefringence.

If you work with optics, please visit the [Sigmadyne](#) web site. At \$3,000 per year this looks like something that can save a lot of time. Contact them for more

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information or for a demo version. In addition, they have just published a book on Optomechanical simulation: Doyle, Genberg, Michels, Integrated Optomechanical Analysis , TT58 SPIE Press, Oct 2002.

Some of the specific features are:

- **Post Analysis Polynomial Fitting**

SigFit can fit Zernike polynomials to a variety of input formats with residual peak-to-valley and RMS surface predictions. Plot files of residual surface deformations are provided in nodal format.

- **Mutiple Input Formats**

Surface deformations may be described by finite element results, nodal files, interferogram hit-maps, or polynomial coefficients.

- **Mutiple Output Formats**

SigFit provides output tables in multiple forms, nodal files for plotting, interferogram files, and direct input files to "ORA/CODEV" and "FOCUS/ZEMAX".

- **Random Response**

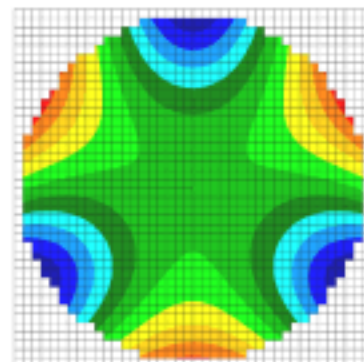
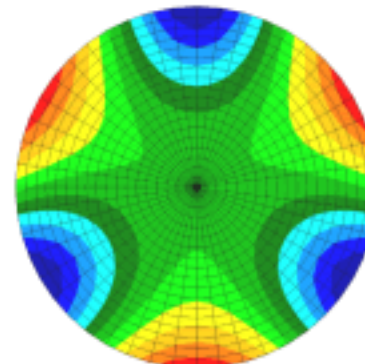
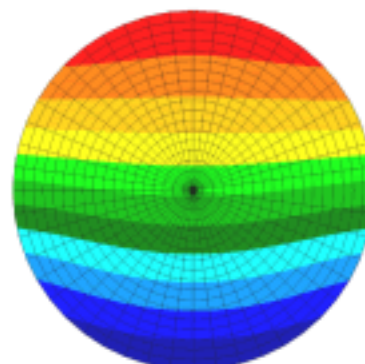
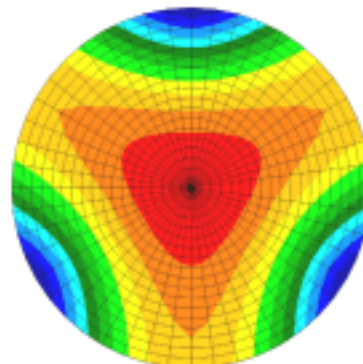
Modal techniques are used to calculate random response of surfaces from natural frequency analysis results in an efficient manner.

- **Interpolation**

SigFit can interpolate surface displacements from an interferogram to a finite element model, from a finite element model to an interferogram, or from one finite element model to another finite element model.

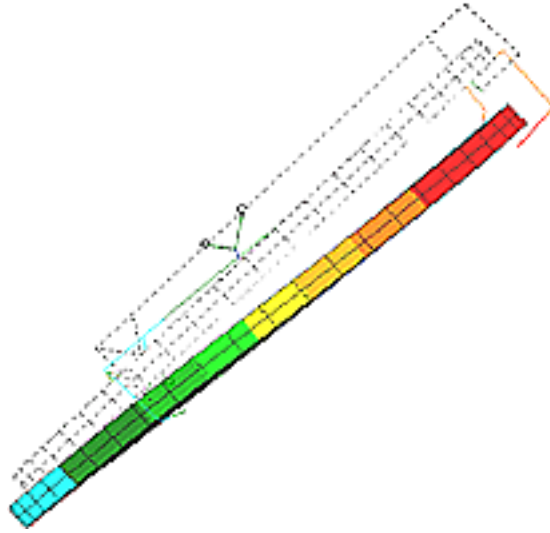
- **Active Optic Simulation**

Actuator forces or displacements are detemined to minimize surface distortion predicted by finite element results, Zernike coefficients, or interferogram input. Polynomial fitting tables and plot files are provided for the input and corrected surface.





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## ANSYS Inc. Buys Microsoft! A Special April 1st Report

by [Rod Scholl](#)

ANSYS Inc. recently unveiled a daring plan to purchase a controlling share of Microsoft Corporation. After ANSYS released the ANSYS-generated Operating System which essentially duplicates the renowned Windows OS in addition to the Office suite of products, the software super-giant Microsoft cried itself to sleep on the eve of [April Fools Day](#). The new ANSYS Windows products look and feel just like the familiar Windows platforms, and even crash frequently to help emulate the behavior people have come to love so well.

The new OS is apparently built from an ancient and cryptic language know as ANSYS Parametric Design Language (or APDL to the enlightened few who understand the code). Although bits of the mysterious language have been documented, its most powerful features are kept hidden from the public eye, protected for centuries by a secret society of Druids.

One ANSYS Druid comments, Actually, you can do anything with APDL. I once programmed ANSYS to mow my lawn. No really, it bagged it up and everything.



**ANSYS**  
*No Boundaries*

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Early this morning, Bill Gates vowed revenge while fleeing Microsoft's Redmond, Washington offices amongst cheers and jeers. Do not be too proud of this technological terror you've constructed. The power of this software is insignificant compared to the power of the Dark Side, said Gates.



With such a large influence on the market, changes in the FEA world are greatly anticipated. The following items are slated for implementation in 2003:

- ANSYS shaped cereal / lunch box
- EMOdif, FIX, FIELD, FAILURE
- Neato blue background (oh wait, that was 2002)
- MPDATA, JELLO
- Personality add-on packs Yoda costs extra.  
( *hmmm... faaailure you see... it is the future* )
- ANSYS-LITE Just 1 calorie!
- Really cool sound effects



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- `/SUE,OFF` turns off stupid errors by the user
- Element196 shaped like ALF
- New GUI driven solely by finger-paints and chanting



However, the Holy Grail of the ANSYS world is reportedly still far from achievable. When asked about a `/UNDO` command, the interviewees were quickly whisked away by the supervising Druids. No comment has since been made by the secretive sect.

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## Archiving Models

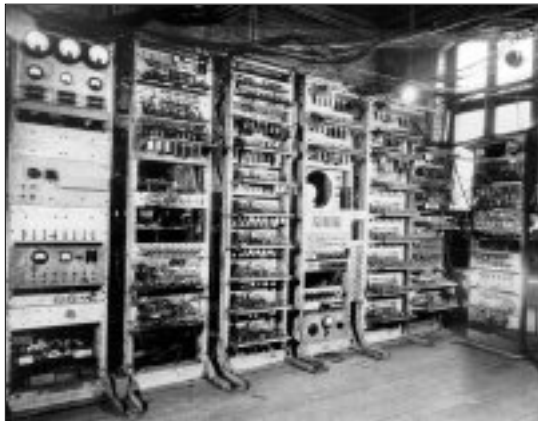
by [Rod Scholl](#)

We're often asked how to archive ANSYS work. Because each company's infrastructure is different, we can only make a recommendation and then point out the pros and cons of alternatives.

So if you want to stop reading here, I would recommend you store a .cdb and .iges (CDWRITE, ALL) from the .db file, and also store a zipped version of the .db file. If you have input files (.inp s, .mac s, etc.), of course save those, too. Finally, if you have results files (.rst s, .rth s, etc.), I would save them until space runs out, then begin deleting them (as long as the .db s and macros exist in the proper format to regenerate them).



## My Take on Storage Space



Many ANSYS analyses are less than 300 MB and almost all fall below the 20 GB range. Thus if one assumes \$1/GB in hard disk costs, it is less than \$20 in hardware cost for 99% of models. (I have neglected the associated I.T. support involved.) In terms of burden rate for today's engineer (\$50 to \$100 per hour), it is a waste of time to worry about wasted space. But the sad truth is we are often required to work on small drives (2 GB isn't uncommon), and getting new space, or archive space, is often impossible. Maybe they think we're storing all sorts of .bmp s of our pets&who knows.

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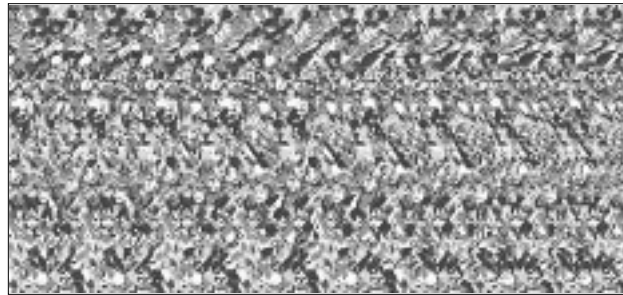


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## Backwards Compatibility Issue

Many of us have spent a large amount of time converting models from the 4.4a version off a Vax machine. This is not fun work, I assure you. If we're lucky, people saved ASCII versions of their model that can be imported. Even if some commands generate problems, at least they can be isolated and addressed separately. Unless you have a way to run the older version to create the older equivalent of the .cdb file, you're stuck. Not knowing for certain what formats the future will bring, the best practice would be to always store an ASCII version of your model. There's nothing worse than a binary file without accompanying software. At best you can print it out and tell someone it's a Magic Eye Puzzle & no, no, keep looking & you'll see it eventually & See the dinosaur? No?

Anyway, so I'm [ASCII](#) all the way.



## The Format Choices

### **.db**

This binary file zips down to about 20% of the original file size. It is handy for at least a few versions of ANSYS release, and even other software packages. But ultimately its life is limited as dictated by ANSYS, Inc and changes to the ANSYS code. Note that a .db file can contain one set of results. Look at the SAVE command for options. For archive purposes, it is less confusing if the results are saved separate from the .db file.

### **.iges CDWRITE , SOLID or IGESOUT**

This is an [IGES](#) representation (ASCII) of the solid model, as well as the applied solid model boundary conditions. Note that the translator that writes the file per the IGES standard, is not the same code as the interpreter that reads the file per the IGES standard. So sometimes ANSYS cannot read its own IGES files! However, on well-defined geometry this isn't all that common.

### **.cdb CDWRITE , DB**

This ASCII file contains all the data in your database, except solid model information; this includes solid model boundary conditions. Thus, you will want to issue SBCTRAN before the CDWRITE , DB. Also, if you want to retain

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solid-model-to-mesh connectivity, you must first read in the IGES file created with `CDWRITE , SOLID`, and *then* read in the file created by `CDWRITE , DB`.

## **CDWRITE , ALL**

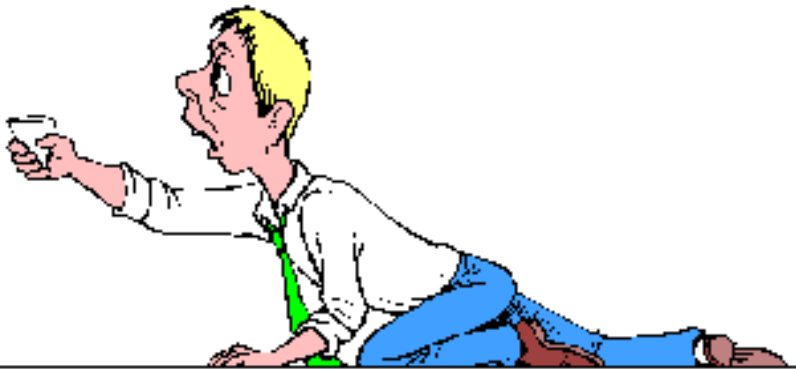
This writes both the `.cdb` and `.iges` files at once. It just saves a little typing. With `CDREAD , ALL` the associativity between the solid model and finite element entities will be automatically restored.

## **.rst (.rth s, rmg s, and Other Results Files)**

These binary files are generated after each solve. Although it is possible to save the results to the `.db` file, this is often confusing, and is better saved as a separate file. There is no ASCII alternative to the `.rst` file. Thus, if there is space, I save it. If not, I ensure the `.db` is in a position to recreate it with a single solve, or a supplied macro. Note that even if it takes a week to solve today, in 10 years when the file is restored, the time will be much shorter because of improvements to processing speed.

## **Everything Else&**

You of course want to save any input files, material files, load step files (usually `.s01`, `.s02`, etc.), physics environment files (`.ph1`, `.ph2`, etc.), scripts, and macros. You might also want to save your `.log` file because this records the entire command history used to build your model. All the other files, such as `.esav` and `.rdb s`, in most cases you won't need. A compromise is to save anything ASCII (if there's space!).



And if in a jam, **beg** for more storage space!

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## About *The Focus*

*The Focus* is a periodic electronic publication published by PADT, aimed at the general ANSYS user. The goal of the feature articles is to inform users of the capabilities ANSYS offers and to provide useful tips and hints on using these products more effectively. *The Focus* may be freely redistributed in its entirety. For administrative questions, please contact [Rod Scholl](#) at PADT.

## *The Focus* Library

All past issues of *The Focus* are maintained in an online [library](#), which can be searched in a variety of different ways.

## Contributor Information

Please don't hesitate to send in a contribution! Articles and information helpful to ANSYS users are very much welcomed and appreciated. We encourage you to send your contributions via e-mail to [Rod Scholl](#).

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