Zemax to ISET: Importing Optics Files

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PSYCH221, Fall 2017
Overview

▪ The Current Process
  › Export from Zemax (Macros)
  › Import into ISET
  › Example Output Using AB0618MG
▪ Updated Files
▪ Tutorial Script
▪ Areas for Improvement / Next Steps
▪ Questions?
Current Process – Exporting from Zemax – Place Macro

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Current Process – Exporting from Zemax – Run Macro
Current Process – Exporting from Zemax – Run Macro
Current Process – Exporting from Zemax – Run Macro
Current Process – Exporting from Zemax – Output Files
Current Process – Importing into ISET – ISETPARMS & Script

```matlab
%% 2) Import Optics From Zemax Files Into ISET Format (.mat)
%
% You should only have to run this section once. Afterward, you will simply % select the "mat" file that is output by this portion when creating your % optics below. Be sure to save the "mat" file at the end of this import. %
% Be sure that the "baseLensFileName" in the ISETPARMS.txt file points to % the directory in which all of the "dat" files reside, otherwise this % portion will NOT work correctly.

ci = ciCreate(); %Need a generic ci to overwrite
optics = ciGet(ci, 'optics'); %Need a generic optics to overwrite
iSetParmsFile = ciSelectDataFile('output','*','*.txt',...
    'Select the ISETPARMS.txt file');
optics = rtImportData(optics, 'zemax', iSetParmsFile);
```
Current Process – Sample Output (AB0618MG Lens)

Scene

Optics
Updated Files

- The Import Macro (ISET_RT_ZEMAX_2D.ZPL)
  - Updated Obsolete Keywords and Formatting
  - Added Some Lines to Make it Work with the Current Lens (for RAYTRACE)
  - Changed to FFT PSF (from Huygen)
  - Added Comments and Cleaned Up a Few Areas
  - Re-Added Ability to Output Grid Distortions (Commented Out)

- ISET Scripts
  - rtFileNames.m (Due to Change by Ginni Grover in 1/2/14)
  - rtImportData.m (Wavelengths and Field Heights were Swapped in the Reshapes)
  - DIInterp.m and RIInterp.m (Wavelengths and Field Heights were Switched)
  - rtGeometry.m (Changed to pnum = 8; 8th degree polynomial, from 6th)
Tutorial Script

- Will Now Demo the Tutorial Script (t_ZemaxImport.m)
Areas for Improvement / Next Steps

- With latest Zemax / Matlab integration, may no longer need Macros
  - Would have to make several modifications to most of the “raytrace” script ecosystem.
  - ISET not currently ready for this kind of integration.
- Several “rt” scripts (including the macros) could be cleaned up / better commenting
  - In particular, rtPrecomputePSFApply.m has a lot of old, commented code.
  - Not always clear what is happening in each script – had to do a lot of digging.
- Interpolation vs. Parameterization for PSF’s
  - Professor Wandell’s suggestion to parameterize the PSF’s and use a weighted average of the mean/variance rather than a simple weighted average of the PSF values themselves.
  - The script where this appears to be done is rtPrecomputePSFApply.m.
  - Was not able to get anything to work sufficiently in time.
- Further Explore Tradeoff Between FOV and Scene Sampling
  - In the context of image field heights (eccentricity bands) and compute time
- Potentially Look Closer at How Geometric Distortion is Calculated and Used
  - Not currently using Grid Distortion Data
  - More dependent upon field height than wavelength
  - Seems to assume radial symmetry
Questions?