1 Basic Pole Figure

The contour levels are not a trivial adjustment. Parts of the pole figure can easily be emphasized or hidden by changing the scale type (log vs linear) and its extremes. The reason to limit the number of contours below random is because the texture components that are important are the ones that are present, and not the ones that aren’t. In the log scale, using the very minimum intensity (as the lowest contour) can easily shift several contours below random. It is good to have some idea of what orientations are less common than random, so one or two contours below one can be used. It makes the most sense to have the highest contour a bit below the strongest orientation so as to make use of all the contours but not to bin too many of the high values into the last level. Here are some pole figures I generated using Rollett’s raw file from the website:

![Pole Figure Diagram]
If there was no preferred orientation, the entire pole figure would be the same color, and it would be the color assigned to the contour level containing 1.0. This is because the entire sample has random texture: no orientation appears more often than any other given orientation.

2 Rotated Pole Figure

The first thing you notice when you plot the pole figures for the 'harmonic analysis' data is that there isn’t a band of missing data around the edge. This is because the analysis fills in that data using the data that is present. You also notice that the data is very similar in the middle, but appears different because the contour level have shifted. This is because there is a new dataset and it has to re-normalized. Pole figures aren’t normalize in the standard sense that everything ”under the curve” adds to one. In this context normalization means that the data is plotted as multiples of random. If the crystal had no preferred texture it would all have the same value of one, whereas in cases where there is texture the stronger areas have a value greater than one and the weaker areas have a value less than one. The ”area under the curve” (sum of all the data) doesn’t come out to a special value (like one in other in other normalization conventions). It should also be noted that the intensity for random comes from the goniometer and the data fed into the popLA is scaled according to this value. popLa doesn’t have a part in determining what the random intensity actually is.

Here are the resulting pole figures:
4 Discrete OD Fit

a

I generated my own CUBIC.WM3 using Page 3 option 8 with cubic symmetry and the poles for the pole figures.

b

I had popLA go through 25 iterations. The texture strength started at 1.2 and stabilized at 1.6. The OD error started at 12.4% and stabilized at 0.8%. I stopped when I saw the same error value (0.8%) three times in a row.

Here is the resulting pole figures (shown with those from the last part for comparison):
The pole figures from the discrete OD are noticeably different (than those from the harmonic analysis), but overall they are very similar.

5 Convert SOD to COD

Nothing to show here.
6 Plot Sections of OD

Input file ISGB.SOD
7 Pare down the SOD

Nothing to see here, move along.

8 Plot Section of the Pared-Down OD

Here you see quadrant sections of the OD, but at every ten degrees instead of every five degrees as in the previous version (degrees along PSI that is).
Here we see the inverse pole figures. These are inverse because instead of using the sample axes as the reference frame the crystal axes become the reference frame. These inverse pole figures show where the rolling direction (1), transverse direction (2), and normal direction (3) appear in reference to the crystal axes. One plot is for one sample axis.