Practices in Code Discoverability: Astrophysics Source Code Library

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Abstract.

Here we describe the Astrophysics Source Code Library (ASCL), which takes an active approach to sharing astrophysical source code. ASCL’s editor seeks out both new and old peer-reviewed papers that describe methods or experiments that involve the development or use of source code, and adds entries for the found codes to the library. This approach ensures that source codes are added without requiring authors to actively submit them, resulting in a comprehensive listing that covers a significant number of the astrophysics source codes used in peer-reviewed studies. The ASCL now has over 340 codes in it and continues to grow.

In 2011, the ASCL has on average added 19 new codes per month. An advisory committee has been established to provide input and guide the development and expansion of the new site, and a marketing plan has been developed and is being executed. All ASCL source codes have been used to generate results published in or submitted to refereed journals and are freely available either via a download site or from an identified source.

This paper provides the history and description of the ASCL. It lists the requirements for including codes, examines the benefits of the ASCL, and outlines some of its future plans.

Note: we don’t seem to have a reference (Teuben et al. 2012) for our other paper.

1. History of the ASCL

In 1999, Robert Nemiroff and John F. Wallin founded the online Astrophysics Source Code Library (ASCL) to house codes of use to the community. This was a volunteer, spare-time endeavor and resulted in a library of 37 codes which had been described in the literature and used to produce research published in or submitted to refereed journals. Twenty-seven of the codes were added to the library in 1999; the last code was added in 2002. The ASCL site also linked to other code libraries, most of which no longer exist or have not been updated in years. In 2003, a search for a new editor for

\[\text{http://asterisk.apod.com/viewforum.php?f=35}\]
the ASCL was unsuccessful. As other code libraries appeared to be under development at that time, the ASCL was no longer being updated though remained available.

In 2010, Nemiroff decided to move the information on the old ASCL site to Starship Asterisk, the discussion forum for APOD. He enlisted volunteer help to move entries to the new site and expand the library (Nemiroff, 2010). In 2011, an advisory committee was established to provide guidance for the development and expansion of the new site.

2. Description of the ASCL and code entry requirements

Starship Asterisk runs on the widely-used open source bulletin board software phpBB. Its index page has two main sections, one of which is Learning & Resources. The ASCL is housed in this section in a separate forum called The Engineering Deck: Astrophysics Source Code Library.

The first three threads of the ASCL are informational threads rather than code threads and include how to add a code, which codes have recently been added, and papers and other resources which may be of interest to astrophysicists and astronomers. Each code listed in the ASCL has its own thread; the first post of a code thread contains the following information:

- Name of code
- Abstract or description of code
- Person(s) credited with writing the code
- Link to the source code site
- Link to a paper which discusses or uses the code
- Unique number for the code

Figure 1 shows a code entry, annotated for the ADASS XXI poster presentation on the ASCL.

Questions about and discussion of the code can be posted to the thread by clicking the POST REPLY button (not shown in Fig. 1) at the top or bottom of the post. It is not necessary to register for the Starship Asterisk forum to read and post on the ASCL site, however, there is an advantage to doing so: registered users can subscribe to the ASCL forum and/or a particular thread on the forum; subscribing alerts a user via email when the thread or forum has been updated.

Though most entries currently do not house the codes themselves, it is possible to attach an archive file (i.e., .zip or .gz) to the code entry for downloading.

Codes are listed alphabetically by name, 100 threads to a page. A full-text search capability is available, and searches can be refined by iterative searching on the results. The ability to search will become increasingly important as the library grows.

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2Starship Asterisk: [http://asterisk.apod.com/viewtopic.php?f=29&t=23735](http://asterisk.apod.com/viewtopic.php?f=29&t=23735)
3. Benefits of the ASCL

Each of the various efforts to aid communication and share knowledge of codes useful for astrophysics has offered valuable information to the community; the difficulty lies in informing and reminding the community that the resource exists. According to Nemiroff, the original ASCL was not successful because most people just didn’t know about it and had few ways to find it.

He came to realize that consistent exposure is needed for a resource to become known and used. With APOD as an entry point to the ASCL, APOD can create the exposure needed to inform and remind astrophysicists of this resource. This is done by posting a link periodically from APOD to the ASCL.

Additional notice about the ASCL is provided by an ongoing email campaign to inform coders of the ASCL and requests to sites which link to the old ASCL site to link to the new one though the old site redirects to the new.

Because the editor seeks codes from peer-reviewed papers and adds entries for them to the library, the ASCL currently houses the largest collection of codes known to the authors. The platform on which the ASCL is housed is familiar and easy to use; it allows for discussion of each code on its own thread, attachment of archive files for those codes which do not have download sites of their own, and consistent updating and expansion. The alphabetical listing of the code entries and full-text and iterative search capabilities allow users to find codes of interest quickly.

4. Growth, usage, and future plans

The ASCL has been expanded greatly from last year to this, and as of this writing, has 340 codes in it. The ASCL has seen 808% growth in the number of codes from the 3rd quarter of 2010 to the 3rd quarter of 2011, as Figure 2 shows. The expansion will continue; we currently have nearly 200 codes in the queue to be added, and actively seek newly-released codes to include. We invite the astrophysics community to suggest
codes that are missing; codes that the community requests be added move to the front of the queue for inclusion.

As the resource has received exposure through APOD, the email campaign, and posts on blogs such as AstroBette\textsuperscript{3} and Astronomy Computing Today\textsuperscript{4} visits to the ASCL have increased; this is demonstrated by the bar graph, of two 30-day periods in 2011, in Figure 2.

![Graph showing growth in ASCL entries and pageviews](image)

Figure 2. Left: From the 3rd quarter of 2010 through the 3rd quarter of 2011, the ASCL grew from 39 to 315 entries. As of this writing (October, 2011), the ASCL has 340 entries in it. Right: Visits to the ASCL have increased from the beginning of 2011; here, two 30-day periods show a 118% increase in the number of visits to the ASCL, as determined by Google Analytics.

We are exploring ways to make the ASCL citable; we believe papers which use codes should cite them, and are working to provide an easy method for doing so.

5. Conclusion

Because of the depth and breadth of the ASCL, the ongoing work to expand it, the exposure provided through APOD, the guidance of advisory committee members who know the astronomical coding community well, and the ease of using the phpbb platform, we feel the newly revised ASCL will become a valuable resource for astronomers and astrophysicists.

\textbf{NOTE ADDED IN PROOF:} ASCL codes are now incorporated into ADS.

References

Teuben, P., Allen, A., Nemiroff, R. J., & Shamir, L. 2012, in ADASS XXI, edited by P. Ballester, & D. Egret (San Francisco: ASP), vol. TBD of ASP Conf. Ser., TBD

\textsuperscript{3}AstroBetter: \url{http://www.astrobetter.com/}

\textsuperscript{4}Astronomy Computing Today: \url{http://astrocompute.wordpress.com/}