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ZGSC (Compressed GSC) and XSKYMAP

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Abstract. A losslessly compressed version of the Guide Star Catalog has been created by the authors and described in the present paper. Supporting software is also discussed.

1. Introduction

The well-known Guide Star Catalog (GSC) is distributed on two CD-ROMs (about 1.2 GB). This leads to a relatively slow access time; furthermore, it is difficult to keep the GSC completely on-line (it requires a lot of hard drive space, or a jukebox, or at least two CD-ROM drives). Furthermore, the actual data in the catalog is not easily accessible. It is in the form of FITS tables, and the coordinates are given in one standard system (J2000.0). To help PC users solve the problem of data retrieval, we have created the Guide Star Catalog Data Retrieval Software, or GUIDARES (Malkov & Smirnov 1995). This is a user-friendly program which lets one easily produce text samplings of the catalog and sky maps in Aitoff or celestial projections. The main function of GUIDARES is to produce an ASCII table of object entries from a specified region, and, optionally, a graphical sky map of the region. It can handle rectangular and circular regions in four different coordinate systems. GUIDARES is also available under UNIX as a C library, with a graphical interface based on IDL widgets.

2. ZGSC

We have created a compressed version of the GSC, called ZGSC. By using a binary format and an adaptive compression algorithm, the GSC was losslessly compressed by a factor of six, giving the ZGSC a total size of about 200 MB. This makes it possible to store the ZGSC on-line on a hard disk for a dramatic improvement in access time.

An extensive software package was developed to work with the ZGSC. This includes a suite of IDL routines that retrieve data from the ZGSC into IDL arrays, and supporting C libraries for on-the-fly decompression of the catalog. The software facilitates retrieval of circular regions, specified by center and size. Four coordinate systems are supported: equatorial and ecliptic (any equinox), galactic, and supergalactic. The software also allows retrieval of objects of a particular type and/or in a particular magnitude range.

In addition, we have developed a WWW interface to the ZGSC,[1] which allows for quick visualization of data from ZGSC over the WWW. Using a forms-capable WWW browser, the user may define an area in any coordinate system, and receive either a GIF or JPEG image of the selected area reconstructed from the ZGSC, or a ZGSC sampling of the selected area in ASCII, FITS ASCII table, or FITS BINTABLE format.

3. XSKYMAP Software

The XSKYMAP software is an IDL widget application for retrieval, visualization and hard copy of ZGSC samplings. The applications of the XSKYMAP are finder charts, GSC studies (Smirnov & Malkov 1997), etc. XSKYMAP is fully integrated with ZGSC and provides easy access to all retrieval options of the ZGSC. It also provides mouse-based catalog feedback (i.e., click on an object to see the full GSC entry). The software supports mouse operations for zoom in/out and re-center region, and click-and-drag facilities to compute angular separation.

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References

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[1] http://www.inasan.rssi.ru/CAD/zgsc