IVOA Astronomical Data Query Language Version 0.7

IVOA Working Draft
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This version:
0.7 http://skyservice.pha.jhu.edu/develop/vo/adql/ADQL-0.7.pdf

Previous versions:
0.6 http://skyservice.pha.jhu.edu/develop/vo/adql/ADQL-0.6.pdf
0.5 http://skyservice.pha.jhu.edu/develop/vo/adql/SkyNodeInterface-0.5.pdf
0.4 http://skyservice.pha.jhu.edu/develop/vo/adql/SkyNodeInterface--0.4.pdf
0.3 http://skyservice.pha.jhu.edu/develop/vo/adql/QueryInterface-2003Aug.pdf
0.2 http://skyservice.pha.jhu.edu/develop/vo/adql/QueryInterface-2003July.pdf

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Abstract

This document describes the Astronomical Data Query Language(ADQL) and SkyQL its string representation,

Status of this document

This is a Working Draft. There are no prior released versions of this document.

Acknowledgments

This work is based on discussions at various IVOA meetings and continuing emails on the mailing list.

Contents

1 Introduction

ADQL is an XML language for constructing queries. This is based on Structured Query Language (SQL). We have many tabular data sets in the VO and many are in relational databases, making SQL an interesting first step. This document is a formal agreement of what is contained in ADQL.

The mechanics of passing a query to a node is described in the SkyNode Interface document []

2 Astronomical Data Query Language(ADQL)

ADQL is passed as an XML document to the Query Interface. ADQL is based on a subset of SQL plus Circle(Cone Search). The only SQL command allowed in ADQL is a “select”. The full XSD for ADQL and services for translation of SQL to ADQL and back may be found at
http://skyservice.pha.jhu.edu/develop/vo/adql/

ADQL-1 ADQL shall be in the form of an XML document.

ADQL-2 All table names in ADQL shall be followed by an alias.

This means queries must take the form

```
Select * from table t
```

This makes substitution of table names much easier as it must be done in only one place to change the alias.

ADQL-3 ADQL shall support Column aliasing using the AS keyword.

ADQL-4 ADQL shall support the region specification as defined by the region.xsd of the IVOA/NVO.

ADQL-5 Mathematical functions shall be allowed in ADQL as follows:

Trigonometric functions: acos, asin, atan, atan2, cos, cot, sin, tan
Math functions: abs, ceiling, degrees, exp, floor, log, log10, mod, pi, power, radians, sqrt, rand, round, truncate

ADQL-6 ADQL documents shall contain a version identifier for the version of ADQL. This will start as 1.0.

Sample applications and tutorials for development and deployment of ADQL services is available at http://skyservice.pha.jhu.edu/develop/vo/adql/

2.1 Schema Diagrams for ADQL

The following Schema diagrams may help to understand the ADQL structure. These are not complete see the XSD for the real thing.

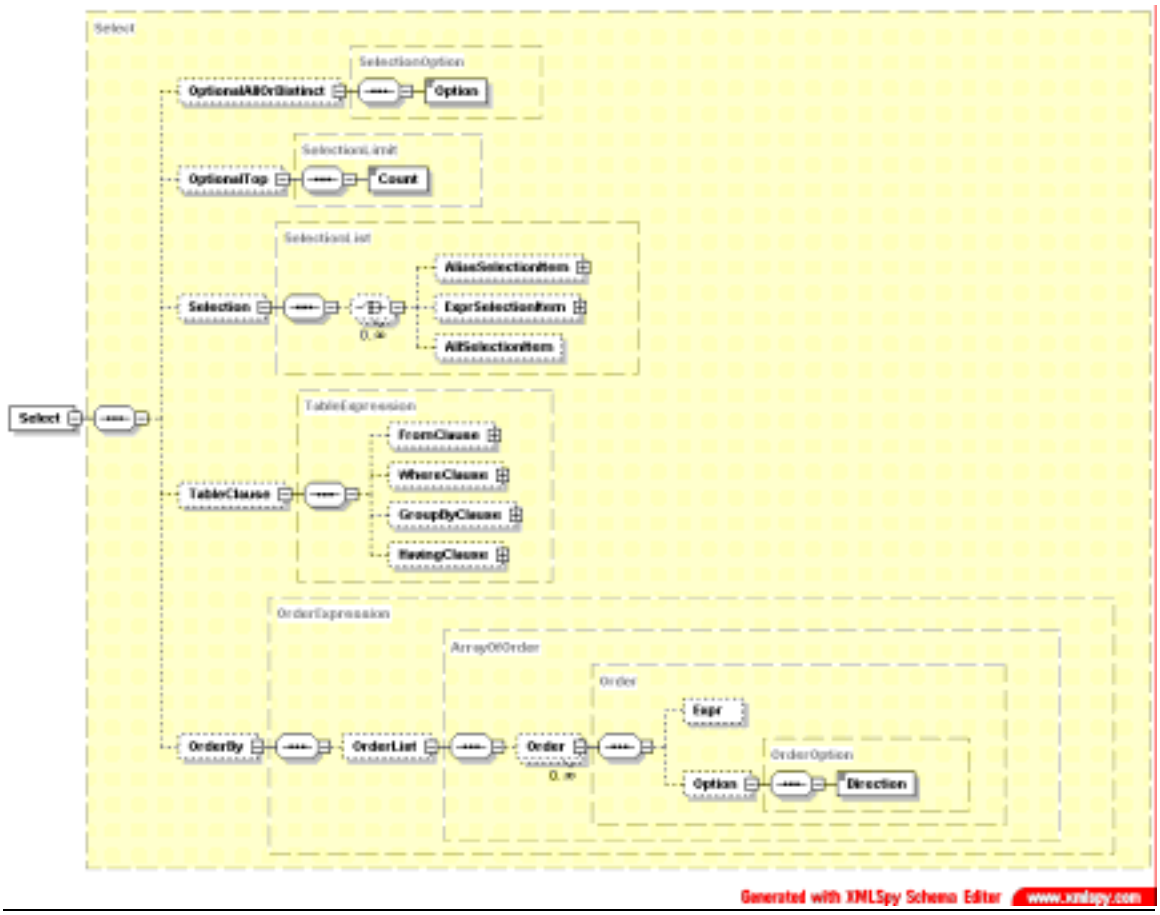

Figure 1. The main element of ADQL – SELECT.

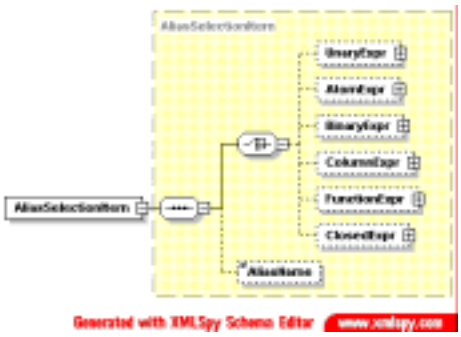

Figure 2. Alias Selection expanded.

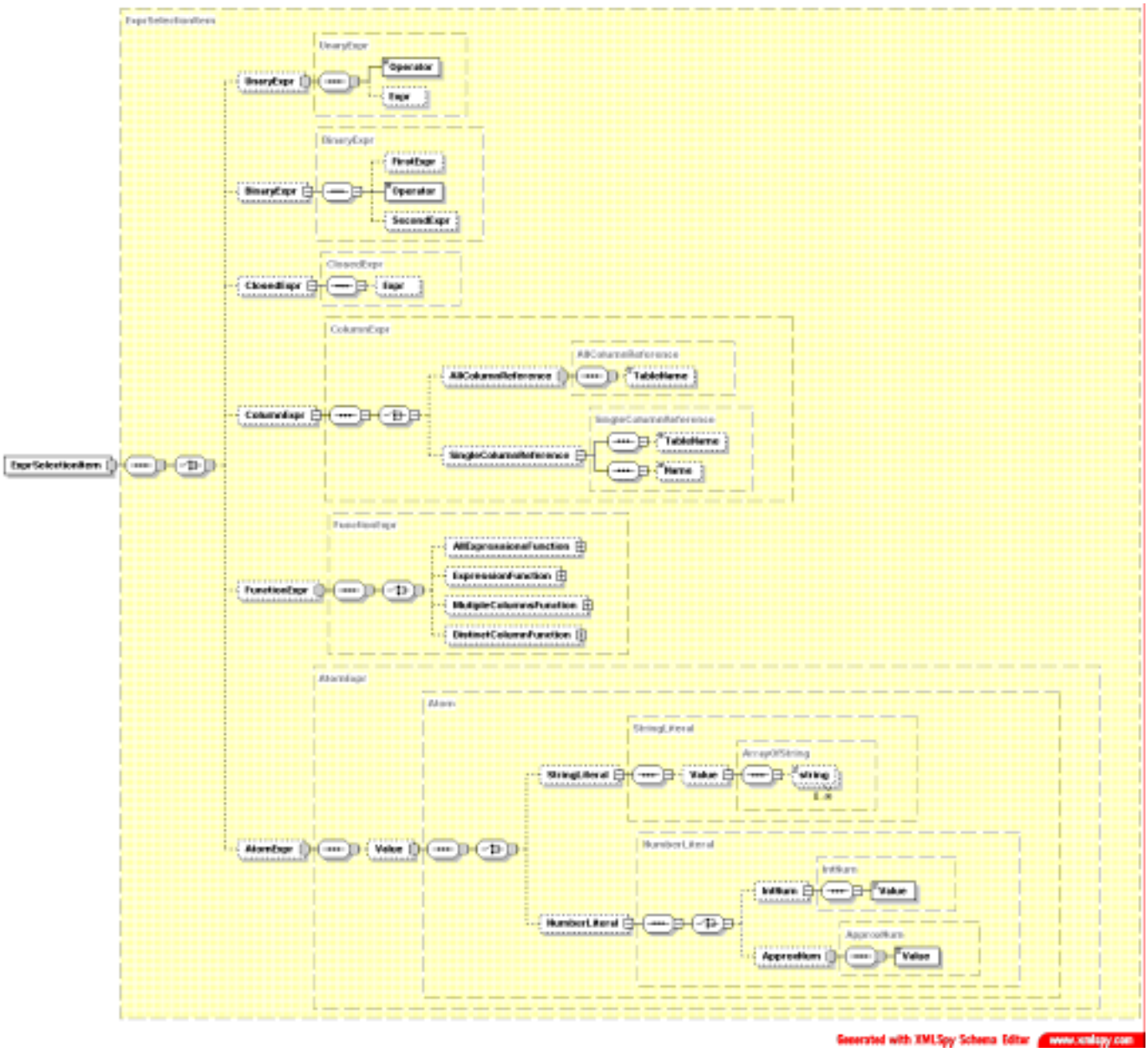

Figure 3. Expression Selection Expanded.

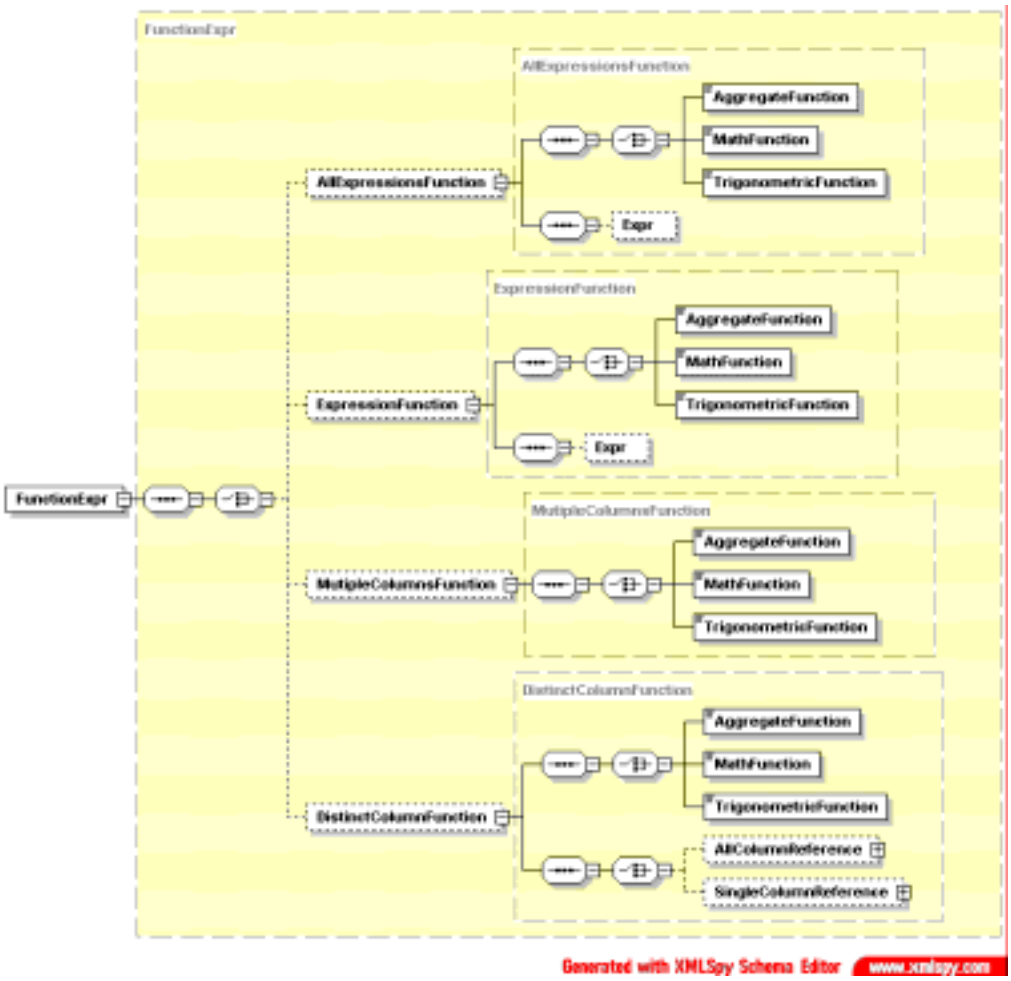

Figure 4. Function Expression Expanded

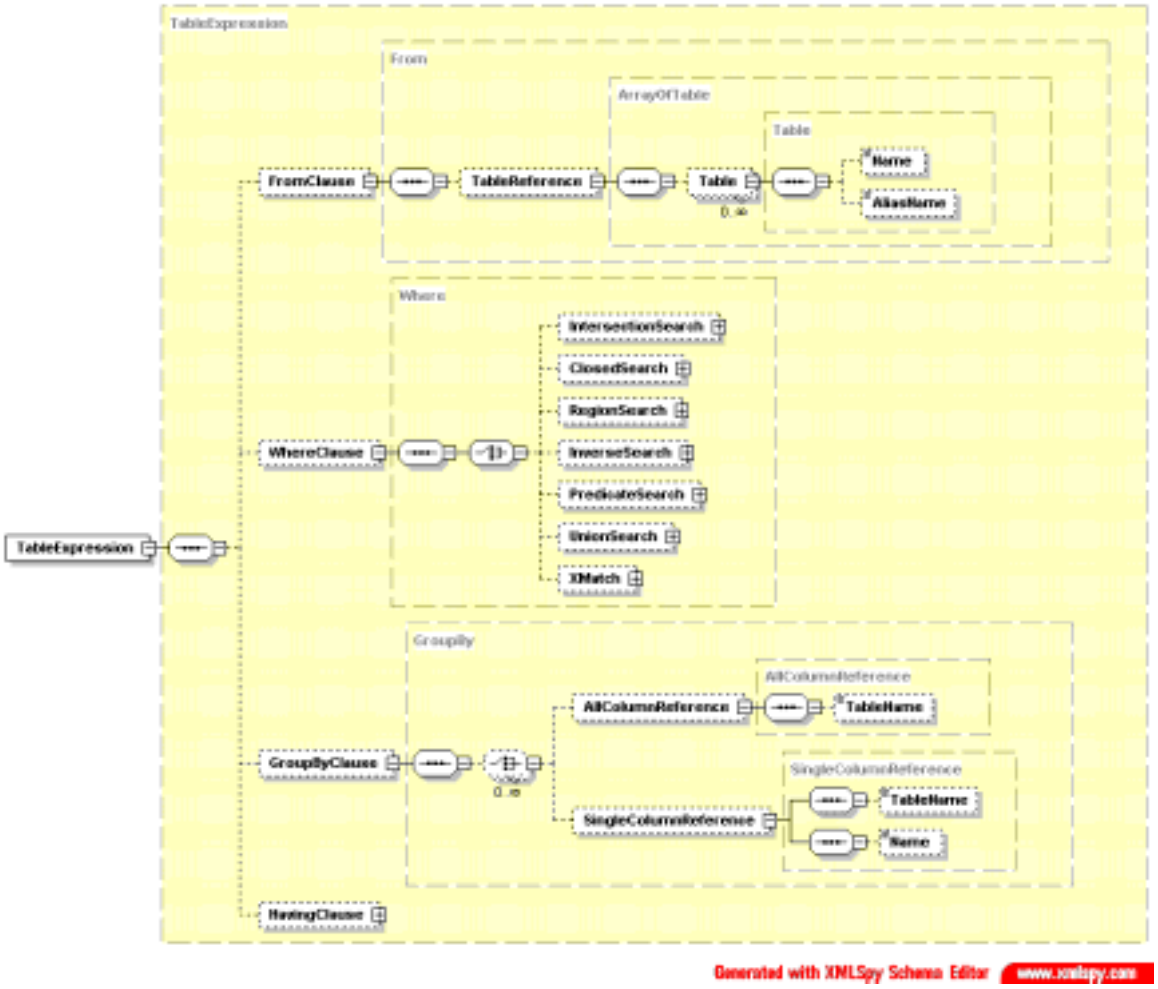

Figure 5. Table part of the select statement

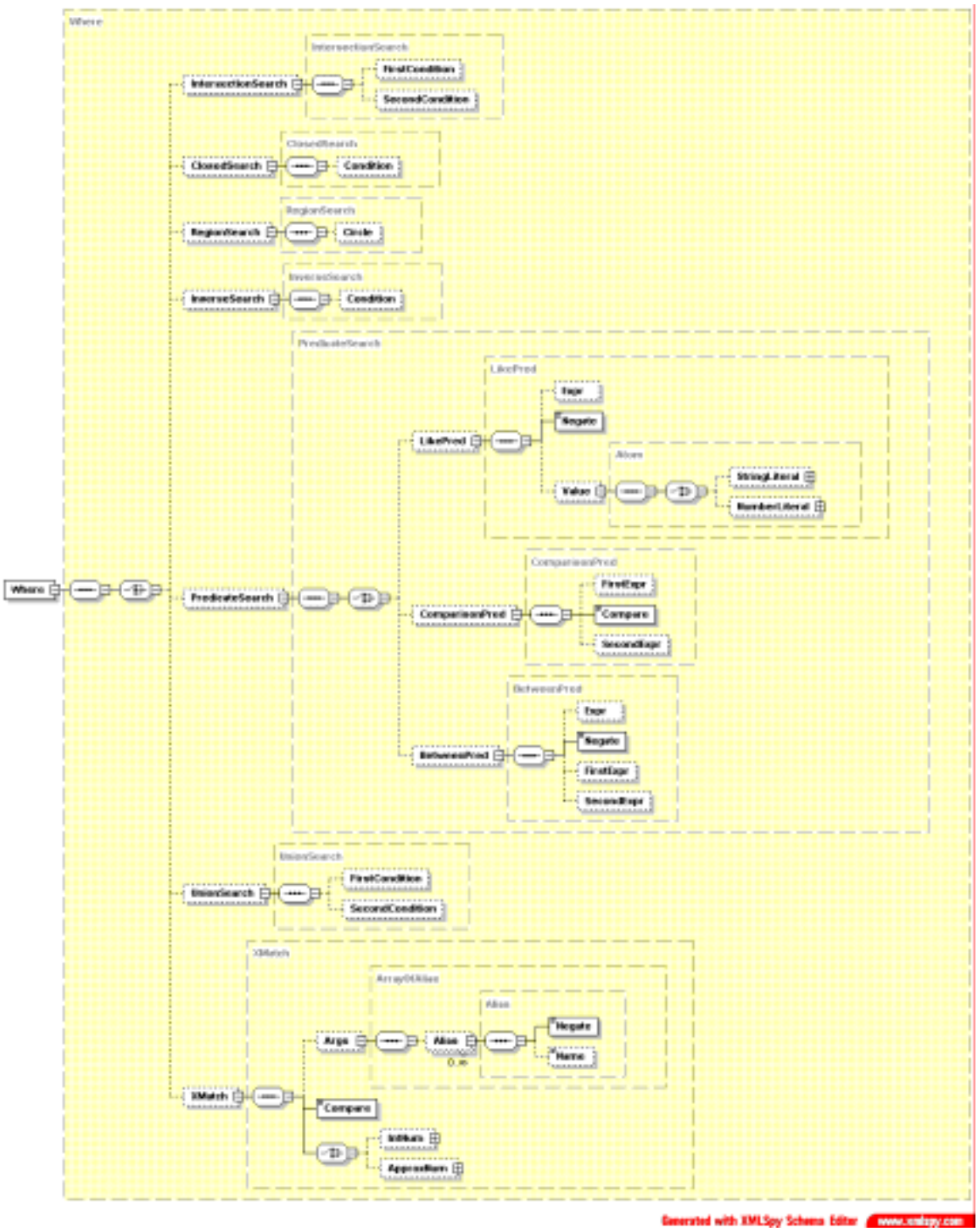

Figure 6. Where part of the select statement

3 SkyQL

SkyQL a string like representation of ADQL. Semantically SkyQL and ADQL are identical. Syntactically ADQL is XML and SkyQL is more human readable. This is like the current SkyQL in SkyQuery.NET .

ADQL-7 SkyQL shall have SQL like Syntax.

ADQL-8 SkyQL shall support the Region keyword. This will be followed by a single quoted string specifying a region in a simple manner similar to the current SDSS cover specification in [HTMDLL]. This would look something like:

```
Region ('CIRCLE J2000 19.5 –36.7 0.02')
```

This is a one way operation. If a SkyQuery string is converted to ADQL this Region string will be converted to XML. If the resulting XML is converted back to a String the region should remain as inlined XML using the RegionXML keyword.
There may be a comment section added to the region xsd. In this comment section the original string should be kept. The comment section will be used for display purposes in certain areas and should contain a summary description (in English) of the region.

ADQL-9 It should be possible to inline a region specification as in SkyQL using the RegionXML keyword e.g. (not a valid region spec)

```
RegionXML ('<circle><coordsys>ICRS</coordsys><ra>19.5</ra><dec>-
36.7</dec><radius>0.02</readius></circle>')
```

ADQL-10 It should be possible to refer to a region specification as a url in SkyQL using the RegionURL keyword e.g.

```
RegionURL ('http://aserver.edu/aregion.xml')
```

4 Changes from previous versions

- Removed a duplicate floor and ln from the list of supported math functions.
- Added rand, round, truncate and log10 to the list of math functions.

5 References

[SQL92] http://www.contrib.andrew.cmu.edu/%7Eshadow/sql/sql1992.txt
[SKYNODE] IVOA VOQL Working group; IVOA SkyNode Interface – get latest from www.ivoa.net/voql