# How to install the library

## A.1   How to get it

The library is available by `ftp` at the following address:

<div align="center">ftp://ftp-sop.inria.fr/galaad/ALP.tgz</div>

or via a cvs server, by typing:

```
cvs -d :pserver:cvs@cvs-sop.inria.fr:/CVS/galaad co ALP
```

This will allow you to install automatically the forthcomming versions, by typing in the `ALP` directory:

```
cvs update
```

## A.2   How to install it

Here are the instructions to install the library:

1. .Get the file ALP.tgz by ftp.

2. Type

```
tar zxvf ALP.tgz
```

(or gzip -dc ALP.tgz —tar -xvf -). You will otain a directory ALP containing the current distribution, that you will put at your convenience in a place that we will refer hereafter by `<ALP>`.

3. Move in `<ALP>` and type `make`. You will obtain

- the script `alp` configured for your environnement and that you can then put where you want (eg. in your `PATH`),
- documentation files in the directory `doc`,
- a directory (lib-linux, lib-solaris or lib-dec) containing the libraries for your architecture.

The current distribution contains the directories

- `src` for the source codes,
- `doc` for the documentation (manual.ps.gz),
- `expl` containing examples,
- `tools`containing tools based on the library
- `config` for the configuration files.

Precompiled external libraries involved in ALP are available at:

- ftp://ftp-sop.inria.fr/galaad/mourrain/lib-linux.tgz (for linux)
- ftp://ftp-sop.inria.fr/galaad/mourrain/lib-solaris.tgz (for sun solaris)

If you want to get in addition the precompile libraries, for other architectures, type:

```
make lib-linux (for pc linux),
make lib-solaris (for sun solaris),
make lib-decosf1 (for dec).
```

## Warning

In order to run correctly the installation, check that the following commands are available:

```
cd, mkdir, echo, sed, rm, uname, wget, tar, make
```

## A.3  The other libraries

The library ALP is connected to

### A.3.1  Arithmetic

- GMP, GNU Multiple Precision Library, developed by T. Granlund. The latest version tested with ALP is 3.1.1.

- MPFR C library for multiprecision floating-point computations with exact rounding, based on GMP and developped by P. Zimmermann

### A.3.2  Linear algebra

- Lapack Linear Algebra PACKage.

- umfpack

- SparseLib

- SuperLU by J. Demmel, J. R Gilbert, Xi S.Li.

### A.3.3  Polynomials

- MPSolve v. 2.0: univariate solveur developed by D. Bini and G. Fiorentino. If you are using GMP 3.0 or later, a patch to MPSolve 2.0 is needed (see here).

- Mixvol and Incres by I.Z. Emiris.

- RS and GB by F. Rouillier and J.C. Faugere.

## A.4　How to use it

Once the `alp` script has been generated, it can be used as a compiler command, as follows:

```
alp <file>.[cc|C]
```

It will generate an executable file `<file>.ex`
It is convenient to use the exmacs compile-mode, to setup such a `<file>.cc`:

1. Edit the `<file>.cc` with emacs

2. Compile it `Esc-x compile [return] alp <file>.cc`

3. If errors appear, click on the corresponding hightlighted part to go to their locations and to correct them.

You can try a first example from the directory `<ALP>`:

```
alp expl/Linalg.ex
```

## A.5　Separate compilation

Files can be compile separately. Using the option `-c` as follows

```
alp  -c <file>.cc
```

will produce a `file.o`, which you will be able to link to another application.

## A.6   Documentation

The `alp` command can also produce a tex documentation file from a `<file>.doc`, as it is illustrated bellow.

```
alp -d <file>.doc
```

It handles the following features:
```
<DOC>file.H</DOC>
<SIGNATURE> ...   </SIGNATURE>
<input> ...   </input>
<output> ...   </output>
```

- For the interesting classes, the signature of the associated methods are displayed.

- For the interesting functions, their exact signature is also displayed.

- Not all the functions are documented.

- The name of the file where these functions can be found (in the `src` directory of `ALP`) is printed on the right-hand side.

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