ox_pari

Risa/Asir ox_pari server
1.0 版
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by Risa/Asir committers

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1 About ox_pari

The ox_pari is an OpenXM server for the number theory system pari. Pari functions can be called as

```
pari(function name, argument 1, ...);
```

The function names which can be called by the OpenXM are listed in the next chapter.

Pari/gp is a system for the number theory developed at Bordeaux university. See the following web page.

- [pari-gp] `http://pari.math.u-bordeaux.fr/index.html`

2 ox_pari functions

2.1 ox_pari

pari(*func*,*arg1*,*arg2*, ...)
:: Call the pari function *func*.

return Result by the pari function.

argn Argument for the pari function.

- ox_pari server starts automatically when the user calls the pari function first time. The number number can be obtained by ctrl("oxpari_id") or ox_get_serverinfo(). In order to interrupt ox_pari or shutdown ox_pari, use ox_reset(server number) and ox_shutdown(server number) respectively. As to these functions, refer to the Risa/Asir manual (see, e.g., documents of `http://www.openxm.org`).
- pari library functions are described in `https://pari.math.u-bordeaux.fr/dochtml/html/`
- The pari library listed below can be called from Risa/Asir. Note that names of library functions are sometimes different with gp function names.

```
/* type=1 : one num/poly/mat arg */
/* type=2 : 1starg=num/poly/mat arg, 2ndarg=0(flag) */

struct parif parif_tab[] = {
/* (ulong)allocatemorememem(ulong) */
  {"allocatemem",(GEN (*)())allocatemoremem,0},
/* num/num */
  {"abs",gabs,1},
  {"erfc",gerfc,1},
  {"arg",garg,1},
  {"isqrt",racine,1},
  {"gamma",ggamma,1},
  {"zeta",gzeta,1},
  {"floor",gfloor,1},
  {"frac",gfrac,1},
  {"imag",gimag,1},
  {"conj",gconj,1},
  {"ceil",gceil,1},
  {"isprime",gisprime,2},
  {"bigomega",gbigomega,1},
  {"denom",denom,1},
  {"numer",numer,1},
  {"lngamma",glngamma,1},
  {"logagm",glogagm,1},
  {"classno",classno,1},
  {"dilog",dilog,1},
  {"disc",discsr,1},
  {"discf",discf,1},
  {"nextprime",nextprime,1},
  {"eintg1",eint1,1},
  {"eta",eta,1},
  {"issqfree",gissquarefree,1},
  {"issquare",gcarreparfait,1},
  {"gamh",ggamd,1},
```

```
{"hclassno",classno3,1},

/* num/array */
{"binary",binaire,1},
{"factorint",factorint,2},
{"factor",Z_factor,1},
{"cf",gcf,1},
{"divisors",divisors,1},
{"smallfact",smallfact,1},

/* poly/poly */
{"centerlift",centerlift,1},
{"content",content,1},

/* poly/array */
{"galois",galois,1},
{"roots",roots,1},
{"factpol",factpol,1},

/* mat/mat */
{"adj",adj,1},
{"lll",lll,1},
{"lllgen",lllgen,1},
{"lllgram",lllgram,1},
{"lllgramgen",lllgramgen,1},
{"lllgramint",lllgramint,1},
{"lllgramkerim",lllgramkerim,1},
{"lllgramkerimgen",lllgramkerimgen,1},
{"lllint",lllint,1},
{"lllkerim",lllkerim,1},
{"lllkerimgen",lllkerimgen,1},
{"trans",gtrans,1},
{"eigen",eigen,1},
{"hermite",hnf,1},
{"mat",gtomat,1},
{"matrixqz2",matrixqz2,1},
{"matrixqz3",matrixqz3,1},
{"hess",hess,1},
{"ker",ker,1},
{"keri",keri,1},
{"kerint",kerint,1},
{"kerintg1",kerint1,1},

/* mat/poly */
{"det",det,1},
{"det2",det2,1},

/* not examined yet */
{"image",image,1},
{"image2",image2,1},
{"indexrank",indexrank,1},
{"indsort",indexsort,1},
{"initalg",initalg,1},
{"isfund",gisfundamental,1},
{"ispsp",gispsp,1},
{"jacobi",jacobi,1},
{"jell",jell,1},
{"length",(GEN(*)())glength,1},
```

```
  {"lexsort",lexsort,1},
  {"lift",lift,1},
  {"lindep",lindep,1},
  {"modreverse",polymodrecip,1},
  {"mu",gmu,1},
  {"norm",gnorm,1},
  {"norml2",gnorml2,1},
  {"numdiv",numbdiv,1},
  {"omega",gomega,1},
  {"order",order,1},
  {"ordred",ordred,1},
  {"phi",phi,1},
  {"pnqn",pnqn,1},
  {"primroot",gener,1},
  {"psi",gpsi,1},
  {"quadgen",quadgen    ,1},
  {"quadpoly",quadpoly    ,1},
  {"recip",polrecip       ,1},
  {"redreal",redreal       ,1},
  {"regula",regula  ,1},
  {"reorder",reorder  ,1},
  {"rhoreal",rhoreal       ,1},
  {"sigma",sumdiv,1},
  {"signat",signat,1},
  {"simplify",simplify,1},
  {"smith",smith,1},
  {"smith2",smith2,1},
  {"sort",sort,1},
  {"sqr",gsqr,1},
  {"sqred",sqred,1},
  {"sqrt",gsqrt,1},
  {"supplement",suppl,1},
  {"trace",gtrace,1},
  {"trunc",gtrunc,1},
  {"unit",fundunit,1},
  {"wf",wf,1},
  {"wf2",wf2,1},
};
```

Example, finding Ker(P: Z^4 —> Z^2).

```
pari(kerint,P=newmat(2,4,[[1,1,1],[0,1,3,4]]));
```

In order to find a description of kerint, please visit `https://pari.math.u-bordeaux.fr/dochtml/html/` (the function name in gp is matkerint.)

参照

ChangeLog

- The table is in OpenXM/src/ox_pari/pari_ftab.c

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