

ox_pari

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

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)allocatemoremem(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", discs, 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},
{"l1l",l1l,1},
{"l1lgen",l1lgen,1},
{"l1lgram",l1lgram,1},
{"l1lgramgen",l1lgramgen,1},
{"l1lgramint",l1lgramint,1},
{"l1lgramkerim",l1lgramkerim,1},
{"l1lgramkeringen",l1lgramkeringen,1},
{"l1lint",l1lint,1},
{"l1lkerim",l1lkerim,1},
{"l1lkeringen",l1lkeringen,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",indxsort,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 $\text{Ker}(P: \mathbb{Z}^4 \rightarrow \mathbb{Z}^2)$.

```
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/dochtm/html/> (the function name in `gp` is `matkerint`.)

参照

ChangeLog

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

Index

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簡単な目次

1	About ox_pari	1
2	ox_pari functions	2
	Index	5

目次

1	About ox_pari	1
2	ox_pari functions	2
	2.1 ox_pari.....	2
	Index.....	5

