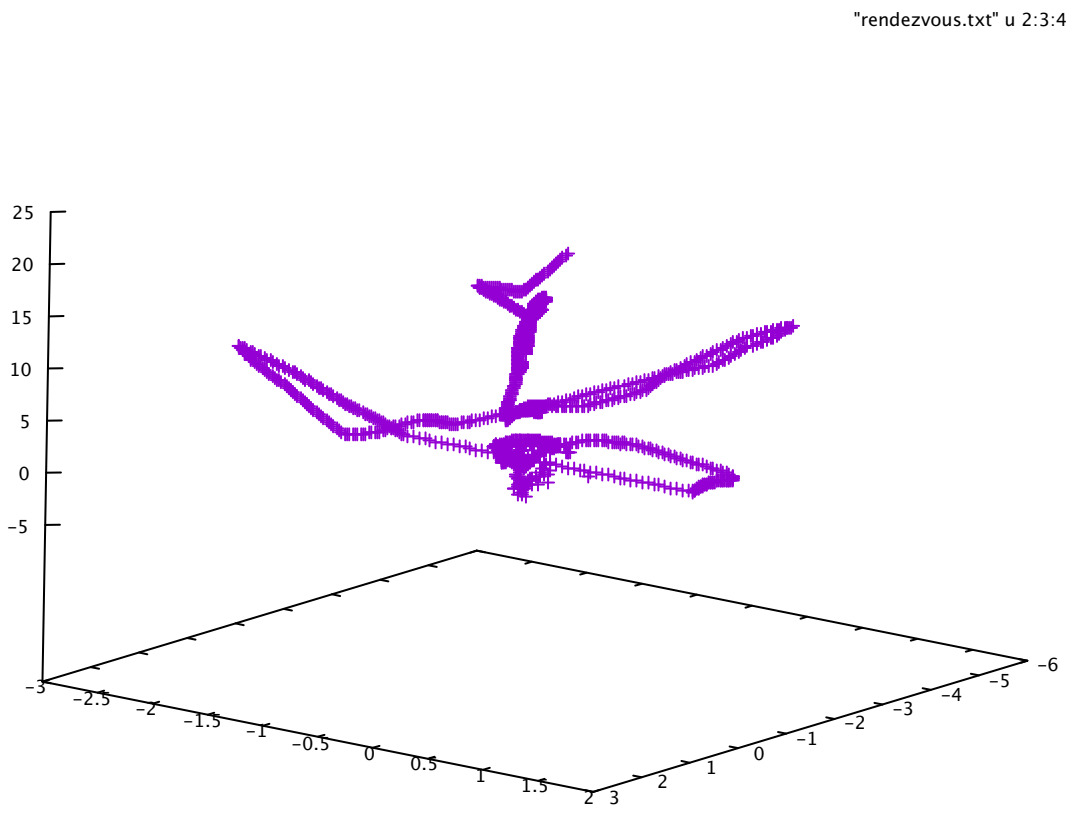
ITC09 Fundamental Data Analysis in Lunar and Planetary Explorations

演習課題3

・前回課題のプログラムを改造して，はやぶさと小惑星イトカワとのランデブー期間中のHAYABUSA_HP座標系における探査機位置を求め，図示できるようにせよ

- spkpos_c()呼出時の例外処理も組み込むこと
- kernelリストは下記を使用すること
  - kernel_list_rendezvous.txt

<出力結果（HAYABUSA_HP座標系での探査機の位置履歴）>



SPICE_tutorial — less ./rendezvous.txt — 128×31

```
2005-09-11T05:00:00
2005-09-11T06:00:00       0.3895          0.5590          24.8305
2005-09-11T07:00:00       0.4001          0.5386          24.6072
2005-09-11T08:00:00       0.4092          0.5186          24.3825
2005-09-11T09:00:00       0.4167          0.4989          24.1563
2005-09-11T10:00:00       0.4227          0.4795          23.9287
2005-09-11T11:00:00       0.4272          0.4606          23.6996
2005-09-11T12:00:00       0.4301          0.4419          23.4691
2005-09-11T13:00:00       0.4314          0.4236          23.2372
2005-09-11T14:00:00       0.4322          0.4054          23.0169
2005-09-11T15:00:00       0.4338          0.3869          22.8185
2005-09-11T16:00:00       0.4352          0.3684          22.6200
2005-09-11T17:00:00       0.4363          0.3500          22.4215
2005-09-11T18:00:00       0.4372          0.3315          22.2230
2005-09-11T19:00:00       0.4378          0.3131          22.0246
2005-09-11T20:00:00       0.4382          0.2947          21.8261
2005-09-11T21:00:00       0.4383          0.2764          21.6276
2005-09-11T22:00:00       0.4382          0.2580          21.4292
2005-09-11T23:00:00       0.4378          0.2397          21.2308
2005-09-12T00:00:00       0.4371          0.2214          21.0323
2005-09-12T01:00:00       0.4362          0.2031          20.8339
2005-09-12T02:00:00       0.4351          0.1849          20.6355
2005-09-12T03:00:00       0.4336          0.1667          20.4371
2005-09-12T04:00:00       0.4326          0.1436          20.3631
2005-09-12T05:00:00       0.4306          0.1200          20.3486
2005-09-12T06:00:00       0.4273          0.0982          20.3450
2005-09-12T07:00:00       0.4228          0.0782          20.3525
2005-09-12T08:00:00       0.4170          0.0600          20.3709
2005-09-12T09:00:00       0.4118          0.0422          20.3652
2005-09-12T10:00:00       0.4077          0.0238          20.3386
:_
```

<コード（rendezvous.c）>

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "SpiceUsr.h"
#define  STRLEN 100
#define NONE 100

int main(int argc, char *argv[]) {
  SpiceDouble            et;
  SpiceDouble            start_et;
  SpiceChar              utc[STRLEN];
  SpiceDouble hayabusa_pos_hayabusa_hp[3];
  SpiceDouble itokawa_lt, hayabusa_lt;
  //Define start time
  SpiceChar   time[STRLEN]="2005-09-10T03:00:00";
  //Counter variable
  int i = 0;

  if (argc < 2) {
    printf("Usage: %s kernel ...\n",argv[0]);
    exit(-1);
  }

  //Read kernels
  while (argc > 1) {
    furnsh_c (argv[1]);
    fprintf(stderr,"%s is loaded.\n",argv[1]);
    --argc; ++argv;
  }

  //Convert UTC time string to et
  str2et_c ( time, &start_et );

  //Output index text
  printf (“#hayabusa_pos_X\tY\tZ\n");
  //Error Handling
  erract_c("SET", STRLEN, "RETURN");
  errdev_c("SET", STRLEN, "NULL");

  //Compute from the start time for 5 days with 1 hour interval
  for(et=start_et;et< start_et+24*3600*73+3600*2;et=et+3600){
    //Convert et to UTC time string
    et2utc_c ( et, "ISOC", 0, STRLEN, utc );
    printf("%s\t",utc);
    spkpos_c ( "HAYABUSA", et, "HAYABUSA_HP", "NONE", "ITOKAWA", hayabusa_pos_hayabusa_hp,
&hayabusa_lt);
    if(failed_c()) {
      hayabusa_pos_hayabusa_hp[0] = NONE;
      hayabusa_pos_hayabusa_hp[1] = NONE;
      hayabusa_pos_hayabusa_hp[2] = NONE;
      reset_c();
    }
    for(i = 0; i < 3; i++)
        if(hayabusa_pos_hayabusa_hp[i] != NONE) printf("%9.4f\t", hayabusa_pos_hayabusa_hp[i]);
    printf("\n");

  }
  return 0;
}
```