

Mortran3 Practice

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Mortran3

- Mortran: More Fortran
- Fortran77コードを生成するstring processor
- EGS4はMortran3を用いることで最も効率的に機能する (Fortran77で直接コーディングも可能)

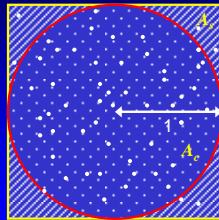
Cook A J 1983 The Mortran3 User's Guide *Stanford Linear Accelerator Center Internal Report* CGTM-209 (Stanford, CA, USA: SLAC)

Hirayama H and Namito Y 1999 Lecture notes of EGS4 course at KEK *High Energy Accelerator Research Organization Report* KEK Internal 99-5 (Tsukuba, Japan: KEK) pp 10-30

Practice: Calculation of π

STEP 1

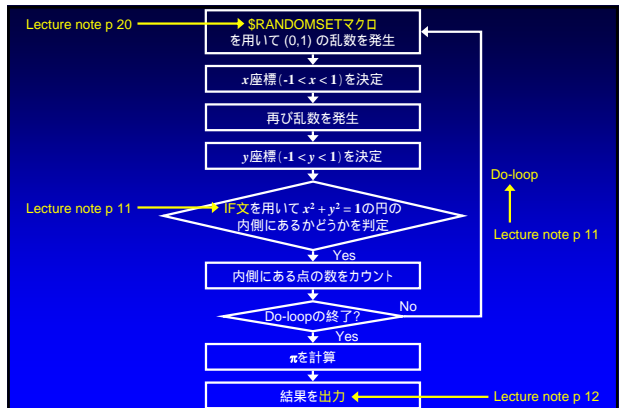
- $-1 < x < 1, -1 < y < 1$ の正方形内に均一に点を分布



STEP 2

- STEP 1の点のうち、 $x^2 + y^2 = 1$ の円の内部にあるものの割合を求め、 π を計算

$$p = \frac{A_c}{A_s} = \frac{\pi}{4}$$



PI.MOR

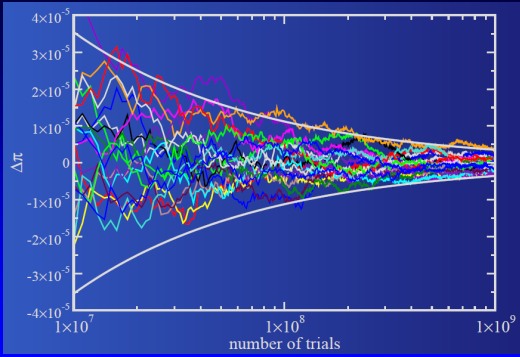
```
!COMMENTS;!INDENT C5;!INDENT M4;!INDENT F2;!LIST;
REPLACE {;COMIN/RANDOM/;} WITH {;COMMON/RANDOM/!XX;};
REPLACE {SRANDOMSET#;} WITH
{!XX=!XX*663608941;{P1}=!XX*0.23283064E-09;IF(!XX.LT.0){P1}={P1}+1.;}
;COMIN/RANDOM/;
!XX=123456789;
!INSIDE=0;
```

***** Write here ! *****

```
END;
%%
```

PI.MOR

```
!COMMENTS;!INDENT C5;!INDENT M4;!INDENT F2;!LIST;
REPLACE {;COMIN/RANDOM/;} WITH {;COMMON/RANDOM/!XX;};
REPLACE {SRANDOMSET#;} WITH
{!XX=!XX*663608941;{P1}=!XX*0.23283064E-09;IF(!XX.LT.0){P1}={P1}+1.;}
;COMIN/RANDOM/;
!XX=123456789;
!INSIDE=0;
!NCASES=100000;
DO !I=1,!NCASES [
  SRANDOMSET !X1; !X2=!X1*2.0-1.0;
  SRANDOMSET !Y1; !Y2=!Y1*2.0-1.0;
  IF (!X2*X2+!Y2*!Y2.LB.1.0) [
    !INSIDE=!INSIDE+1;]]]
!PIVAL=4.0*!FLOAT(!INSIDE)/!FLOAT(!NCASES);
OUTPUT !PIVAL; ('Estimated pi value =!PE12.5);
STOP;
END;
%%
```



Kawrakow AAPM Summer School (2006)