Seismic Calculator

User Manual

IPLAB

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Start:

Seismic attributes->

Seismic Calculator

The seismic calculator use the following rules:

1. **The defined procedure used to calculate every sample in result cube.**
2. **There are several predefined variables.**
   - **I, J, K – index for current sample**
   - **X, Y, Z – coordinates for current sample.**
   - **nI, nJ, nK – size of the moving window with available neighboring samples for calculation around current samples.**
   - **Cube – array with values in moving window. Size of the array is Cube[ncube][nI,nJ,nK] where ncube -is number cubes used like input.**
   - **Seis0, Seis1, …, Seis'ncube' – predefined values of the cubes used like input for current sample (center of the moving window).**
3. **Result cube of the procedure can be only one for one run.**
4. **Result cube will be virtual.**
5. **Name of the result cube will be defined by variable with '=' (TokenKind.ASSIGN). For example if we have procedure string:**

   cubeResult=100;

   it create new virtual cube with name "cubeResult" with constant value=100.
6. **If we use several strings for procedure, only last ASSING will define procedure result. For example if we have procedure string:**

   d=(X-1000)(x-1000)+(y-3000)*(y-3000)*

   cubeResult=sqrt(d);

   it create only one new virtual cube with name "cubeResult"
7. **Procedure can use several predefined function sin(), cos(), abs(), pow(,), atan2(,), sqrt(), exp(), log(), sign(), rand(), iif(,,).**
8. **Additionally all function like Math.Sqrt(), … can be used.**
9. **C# constrictions like for(;;) {}, if() else, and any other can used.**

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10.Below example to calculate simple coherence attribute:

```
double sum=0;
int n=0;
for(int k=0; k< nK; k++)
 {
   for(int i=0; i< nI; i++)
     for(int j=0; j< nJ; j++)
     {
       int ii =nI/2+1;
       int jj =nJ/2+1;
         var diff=abs(Cube[0][i,j,k]- Cube[0][ii,jj,k]);
         var norm=abs(Cube[0][i,j,k]+ Cube[0][ii,jj,k]);
        if(norm==0)norm=1000000; // protect to division to zero
        var rez= (diff/norm);
       sum+=rez;
       n++;
     }
 }
coherence=sum/n;
```


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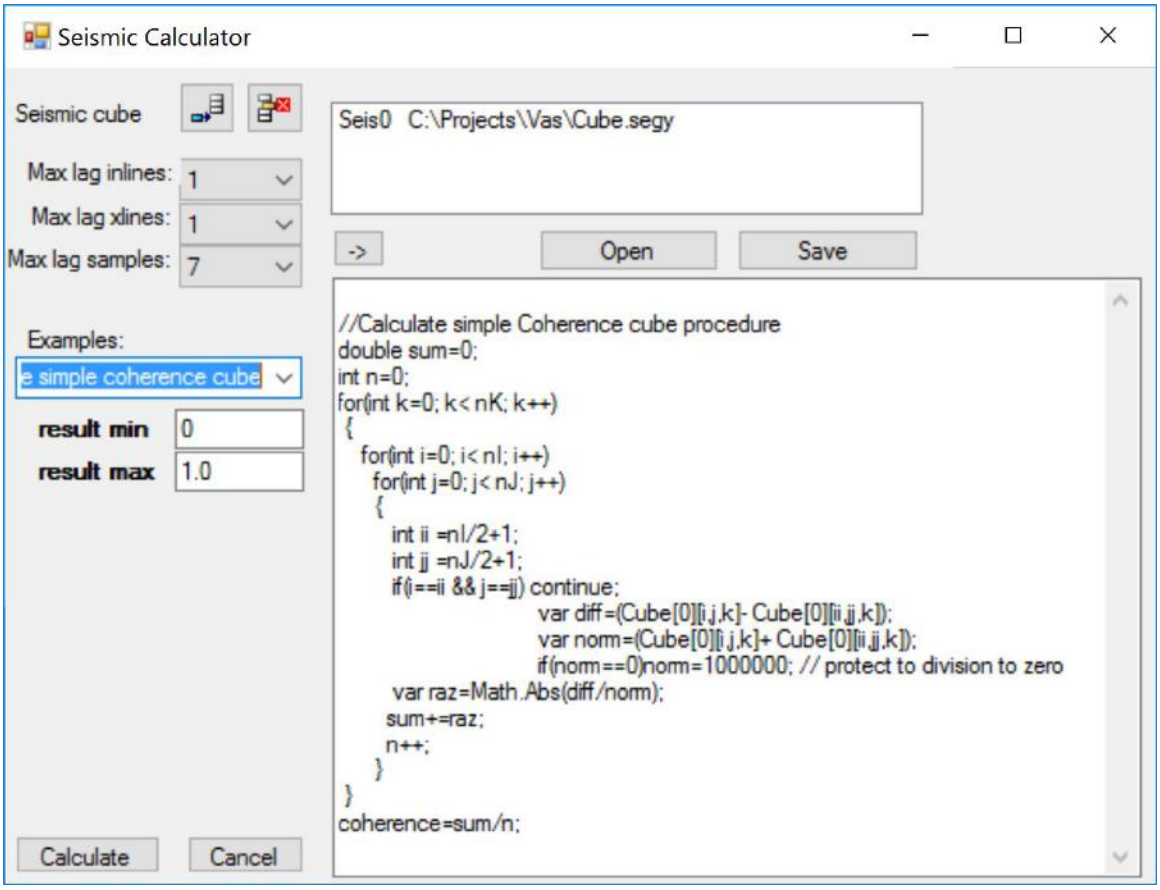

Figure 1: Seismic calculator

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