

Табличный синус (плавающие числа)

Идея: поскольку $|\sin x| < 1$, можно считать его значения по таблице с равномерным шагом, равным требуемой точности результата.

Реализация:

```
diff -ruN src-org/sunset.cpp src-more/sunset.cpp
--- src-org/sunset.cpp 2007-09-16 12:04:44.000000000 +0400
+++ src-more/sunset.cpp 2007-11-07 09:55:27.000000000 +0300
@@ -45,6 +45,8 @@
 #include <omp.h>
 #endif
 #include "sunset.h"
+#include <ippvm.h>
+#include <ippm.h>

 #define MIN(x,y)    (((x) < (y)) ? (x) : (y))
 #define MAX(x,y)    (((x) < (y)) ? (y) : (x))
@@ -115,6 +117,33 @@
     }
 }

+#define SIN_TAB_SZ 16384
+#define PI2 (2*3.141592653589793f)
+float g_sinTab[2*SIN_TAB_SZ+1];
+
+void fillSinTab()
+{
+ for(int i=0;i<2*SIN_TAB_SZ+1;++i)
+ {
+   g_sinTab[i]=sinf((i-SIN_TAB_SZ)*PI2/SIN_TAB_SZ);
+ }
+}
+
+inline float tab_sinf(float v)
+{
+ int idx=(((int)(v*(SIN_TAB_SZ/PI2))) % SIN_TAB_SZ)+SIN_TAB_SZ;
+ return g_sinTab[idx];
+}
+
+inline float lin_sinf(float v)
+{
+ float i=fmodf(v,PI2)*SIN_TAB_SZ/PI2+SIN_TAB_SZ;
+ size_t idx=i;
+ float d=i-idx;
+
+ return g_sinTab[idx]*(1-d)+g_sinTab[idx+1]*d;
+}
```

```
+
/*-----*/

#define DECLARE_ALIGNED_PTR(type, pName) \
@@ -320,6 +349,7 @@
/*-----
--*/
    if(iCurFrame == 1)
    {
+        fillSinTab();
        iWaveMeshSize = iWaveHarmNum * iAngleHarmNum;

        if(iAllocated == 1)
@@ -730,30 +760,34 @@
!!!!!!!!!!!!!!!!!!!! Water surface modelling !!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
*/
+        pFlTmp = flArgSin[currentthread].aptr;
+        flDerivX = 0.;
+        flDerivY = 0.;
+#if 1
        for(t = 0; t < NKMAX; t++)
        {
-            OT = flOmega[t] * flTime;
+            OT = flOmegaTime[t];
            KX1 = flK[t] * flDecartX[i][j];
            KY1 = flK[t] * flDecartY[i][j];

            for(l = 0; l < iAngleHarmNum; l++)
            {
                iSinIndex1 = t * iAngleHarmNum + l;
-                flArgSin[currentthread].aptr[iSinIndex1] = OT -
+                pFlTmp[iSinIndex1] = OT -
                    KX1 * flAzimuthCosFi[l] - KY1 *
flAzimuthSinFi[l] +
-                    flRandomPhase[t*iAngleHarmNum + l];
+                    flRandomPhase[iSinIndex1];
            } /* end for l */
        } /* end for t */

-        pFlTmp = flArgSin[currentthread].aptr;
-
+//        ippSin_32f_A11(pFlTmp,pFlTmp,iWaveMeshSize);
+        #pragma ivdep
+        #pragma vector
        for(t=0; t<iWaveMeshSize; t++)
-            pFlTmp[t] = (float)sinf(pFlTmp[t]);
+        {
+            pFlTmp[t] = (float)tab_sinf(pFlTmp[t]);

```

```
+      }  
  
      /* initialize the values of derivation */  
-      flDerivX = 0.0f;  
-      flDerivY = 0.0f;  
  
      /* dot product to compute derivation */  
      for(t = 0; t < iWaveMeshSize; t++)  
@@ -761,6 +795,7 @@          flDerivX += pFlTmp[t] * flAmplitudeX[t];  
          flDerivY += pFlTmp[t] * flAmplitudeY[t];  
      }  
+#endif  
  
      /* Near horizont area correction */  
      flDerivX *= P2;
```

Результат: gcc - медленно, iss - догоняем iprsSinf. Основной тормоз - смешанная арифметика, перевод плавающего числа в целое.

From:
<http://wiki.osll.ru/> - **Open Source & Linux Lab**

Permanent link:
http://wiki.osll.ru/doku.php/etc:common_activities:intel_students_cup:tab_sin?rev=1194457402

Last update: **2008/01/03 02:32**

