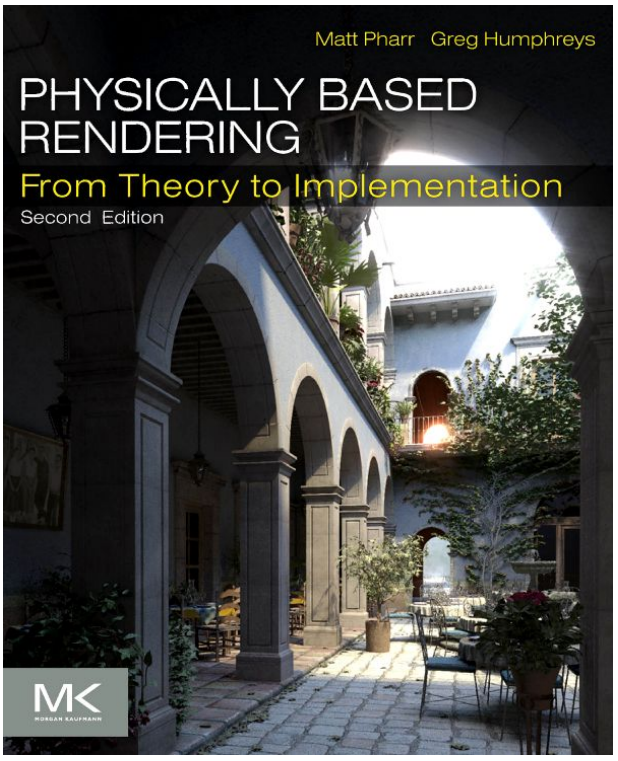
UNIVERSIDADE DA CORUÑA

Máster Universitario en Ingeniería Informática

Benchmark PBRT ray tracing



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Conclusión **16**

Escenas

Las escenas asignadas para la realización del benchmark son:

- head/head.pbrt

- lte-orb/lte-orb-roughglass.pbrt

Renderizado de escenas

Para el renderizado de las escenas se han empleado una máquina con las siguientes características:

Máquina 1:

Ubuntu sobre Virtualbox en host Windows 10. A la máquina virtual se le han asignado 4 núcleos a 2.5 Ghz de un intel core i7 4710HQ con 8GB de RAM y 128 MB de memoria de vídeo.

Resultados

head/head.pbrt

Vista Original

- Vista original utilizando bvh como estructura de aceleración

```
Maquina1   x:~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/head/head.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
W0128 13:56:34.715242  2985 error.cpp:87] /home/angel/Escritorio/head/head.pbrt(35): Parameter "discarddegenerateUVs"
not used
Rendering: [++++++++++++++++++++++++++++++++++++++++++++++++]  (2833.0s)
Statistics:
```

```
BVH
  Interior nodes                          16201
  Leaf nodes                              16202
  Primitives per leaf node          17674 /       16202 (1.09x)
Integrator
  Camera rays traced                    1035468800
  Path length                           0.553 avg [range 0 - 2]
  Zero-radiance paths             236218152 /    654174617 (36.11%)
Intersections
  Regular ray intersection tests          3173194160
  Shadow ray intersection tests            698728215
  Ray-triangle intersection tests   1786518181 /  15031558089 (11.89%)
Memory
  BVH tree                              1.26 MiB
  Film pixels                           7.71 MiB
  Texture MIP maps                        192.00 MiB
  Triangle meshes                         1.56 MiB
Scene
  Lights                                1
  Materials created                       2
  Shapes created                        17674
  Triangles per triangle mesh       17674 /          1 (17674.00x)
Texture
  EWA lookups                           654174617
  Trilinear lookups                    1859190783
Profile
  Integrator::Render()                      99.93% (   0:47:14.53)
    Camera::GenerateRay[Differential]()           1.26% (   0:00:35.85)
    Film::AddSample()                       0.59% (   0:00:16.83)
    Sampler::GetSample[12]D()                 2.55% (   0:01:12.41)
    Sampler::StartPixelSample()               0.00% (   0:00:00.00)
    SamplerIntegrator::Li()                  94.34% (   0:44:35.91)
      Accelerator::Intersect()               12.77% (   0:06:02.34)
        Triangle::Intersect()                3.32% (   0:01:34.25)
      BSDF::Sample_f()                        5.08% (   0:02:24.11)
      BSSRDF::Sample_f()                      0.12% (   0:00:03.36)
      BSSRDF::f()                            15.25% (   0:07:12.55)
        BSSRDF::Sample_f()                      15.25% (   0:07:12.55)
          Accelerator::Intersect()              8.76% (   0:04:08.34)
            Triangle::Intersect()               2.23% (   0:01:03.35)
      Direct lighting                       50.98% (   0:24:06.12)
        Accelerator::Intersect()              12.09% (   0:05:42.80)
          Triangle::Intersect()               2.90% (   0:01:22.28)
        Accelerator::IntersectP()             11.31% (   0:05:20.68)
          Triangle::IntersectP()              2.11% (   0:00:59.94)
        BSDF::PDF()                           1.00% (   0:00:28.22)
        BSDF::Sample_f()                      5.16% (   0:02:26.31)
        BSDF::f()                            1.75% (   0:00:49.76)
        Light::Pdf()                         2.72% (   0:01:17.20)
        Light::Sample_*()                     10.02% (   0:04:44.29)
          MIPMap::Lookup() (trilinear)              3.00% (   0:01:25.11)
        MIPMap::Lookup() (trilinear)                1.45% (   0:00:41.10)
        Sampler::GetSample[12]D()                   2.00% (   0:00:56.81)
      MIPMap::Lookup() (trilinear)                  0.78% (   0:00:22.20)
      Material::ComputeScatteringFunctions()              5.25% (   0:02:28.98)
        MIPMap::Lookup() (EWA)                      2.36% (   0:01:06.88)
      Sampler::GetSample[12]D()                     1.29% (   0:00:36.62)
    Scene parsing and creation                      0.07% (   0:00:01.98)
    Acceleration structure creation                 0.00% (   0:00:00.00)
    MIP map generation                              0.00% (   0:00:00.06)
    MIPMap::Lookup() (trilinear)                    0.03% (   0:00:00.97)
    Texture loading                                 0.01% (   0:00:00.40)
      MIP map generation                            0.00% (   0:00:00.03)
Profile (flattened)
  Accelerator::Intersect()                  25.16% (   0:11:53.58)
  BSDF::Sample_f()                          10.24% (   0:04:50.43)
  Accelerator::IntersectP()                  9.19% (   0:04:20.73)
  Triangle::Intersect()                     8.46% (   0:03:59.90)
  Light::Sample_*()                         7.02% (   0:03:19.18)
  BSSRDF::Sample_f()                            6.61% (   0:03:07.57)
```

```
  Sampler::GetSample[12]D()                    5.85% (   0:02:45.86)
  MIPMap::Lookup() (trilinear)                 5.27% (   0:02:29.39)
  Direct lighting                              3.49% (   0:01:38.91)
  Material::ComputeScatteringFunctions()       2.89% (   0:01:22.09)
  SamplerIntegrator::Li()                      2.81% (   0:01:19.59)
  Light::Pdf()                                 2.72% (   0:01:17.20)
  MIPMap::Lookup() (EWA)                       2.36% (   0:01:06.88)
  Triangle::IntersectP()                       2.11% (   0:00:59.94)
  BSDF::f()                                    1.75% (   0:00:49.76)
  Camera::GenerateRay[Differential]()          1.26% (   0:00:35.85)
  Integrator::Render()                         1.18% (   0:00:33.49)
  BSDF::PDF()                                  1.00% (   0:00:28.22)
  Film::AddSample()                            0.59% (   0:00:16.83)
  Scene parsing and creation                   0.02% (   0:00:00.52)
  Texture loading                              0.01% (   0:00:00.37)
  MIP map generation                           0.00% (   0:00:00.10)
  Acceleration structure creation              0.00% (   0:00:00.00)
  Sampler::StartPixelSample()                  0.00% (   0:00:00.00)
```

- Vista original utilizando kd-tree como estructura de aceleración

```
Máquina 1 :~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/head_kdtree/head.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
W0128 14:54:24.258430  3470 error.cpp:87] /home/angel/Escritorio/head_kdtree/head.pbrt(37): Parameter
"discarddegenerateUVs" not used
Rendering:
[++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++]  (3417.8s)
Statistics:
  Integrator
    Camera rays traced                         1035468800
    Path length                                0.553 avg [range 0 - 2]
    Zero-radiance paths                236218146 /    654174616 (36.11%)
  Intersections
    Regular ray intersection tests             3173194161
    Shadow ray intersection tests               698728211
    Ray-triangle intersection tests          2982574780 /  51282882605 (5.82%)
  Memory
    Film pixels                                7.71 MiB
    Texture MIP maps                           192.00 MiB
    Triangle meshes                            1.56 MiB
  Scene
    Lights                                     1
    Materials created                          2
    Shapes created                             17674
    Triangles per triangle mesh                17674 /           1 (17674.00x)
  Texture
    EWA lookups                                654174616
    Trilinear lookups                          1859190786
  Profile
    Integrator::Render()                       99.94% (   0:56:59.63)
      Camera::GenerateRay[Differential]()      1.02% (   0:00:34.91)
      Film::AddSample()                        0.47% (   0:00:16.09)
      Sampler::GetSample[12]D()                2.05% (   0:01:10.24)
      Sampler::StartPixelSample()              0.00% (   0:00:00.01)
      SamplerIntegrator::Li()                  95.43% (   0:54:25.34)
        Accelerator::Intersect()               14.47% (   0:08:15.10)
          Triangle::Intersect()                6.37% (   0:03:37.99)
        BSDF::Sample_f()                       4.13% (   0:02:21.29)
        BSSRDF::Sample_f()                     0.10% (   0:00:03.43)
        BSSRDF::f()                            16.02% (   0:09:08.23)
          BSSRDF::Sample_f()                   16.02% (   0:09:08.23)
```

```
        Accelerator::Intersect()                  10.79% (   0:06:09.10)
          Triangle::Intersect()                    4.49% (   0:02:33.52)
      Direct lighting                             52.36% (   0:29:51.80)
        Accelerator::Intersect()                  14.43% (   0:08:13.76)
          Triangle::Intersect()                    5.43% (   0:03:05.74)
        Accelerator::IntersectP()                 15.61% (   0:08:54.18)
          Triangle::IntersectP()                   4.52% (   0:02:34.78)
        BSDF::PDF()                                0.78% (   0:00:26.62)
        BSDF::Sample_f()                           4.22% (   0:02:24.36)
        BSDF::f()                                  1.43% (   0:00:48.84)
        Light::Pdf()                               2.29% (   0:01:18.50)
        Light::Sample_*()                          8.06% (   0:04:35.63)
          MIPMap::Lookup() (trilinear)             2.38% (   0:01:21.53)
        MIPMap::Lookup() (trilinear)               1.12% (   0:00:38.30)
        Sampler::GetSample[12]D()                  1.57% (   0:00:53.62)
      MIPMap::Lookup() (trilinear)                 0.68% (   0:00:23.24)
      Material::ComputeScatteringFunctions()       4.28% (   0:02:26.49)
        MIPMap::Lookup() (EWA)                     1.89% (   0:01:04.72)
      Sampler::GetSample[12]D()                    1.04% (   0:00:35.47)
    Scene parsing and creation                     0.06% (   0:00:02.17)
      Acceleration structure creation              0.00% (   0:00:00.04)
      MIP map generation                           0.00% (   0:00:00.08)
      MIPMap::Lookup() (trilinear)                 0.03% (   0:00:01.17)
      Texture loading                              0.01% (   0:00:00.43)
        MIP map generation                         0.00% (   0:00:00.03)
  Profile (flattened)
    Accelerator::Intersect()                      23.40% (   0:13:20.70)
    Triangle::Intersect()                         16.29% (   0:09:17.27)
    Accelerator::IntersectP()                     11.09% (   0:06:19.40)
    BSDF::Sample_f()                               8.35% (   0:04:45.65)
    Light::Sample_*()                              5.67% (   0:03:14.10)
    BSSRDF::Sample_f()                             5.34% (   0:03:02.57)
    Sampler::GetSample[12]D()                      4.66% (   0:02:39.33)
    Triangle::IntersectP()                         4.52% (   0:02:34.78)
    MIPMap::Lookup() (trilinear)                   4.22% (   0:02:24.26)
    Direct lighting                                2.86% (   0:01:37.94)
    Material::ComputeScatteringFunctions()         2.39% (   0:01:21.76)
    SamplerIntegrator::Li()                        2.35% (   0:01:20.25)
    Light::Pdf()                                   2.29% (   0:01:18.50)
    MIPMap::Lookup() (EWA)                         1.89% (   0:01:04.72)
    BSDF::f()                                      1.43% (   0:00:48.84)
    Camera::GenerateRay[Differential]()            1.02% (   0:00:34.91)
    Integrator::Render()                           0.97% (   0:00:33.02)
    BSDF::PDF()                                    0.78% (   0:00:26.62)
    Film::AddSample()                              0.47% (   0:00:16.09)
    Scene parsing and creation                     0.01% (   0:00:00.44)
    Texture loading                                0.01% (   0:00:00.40)
    MIP map generation                             0.00% (   0:00:00.11)
    Acceleration structure creation                0.00% (   0:00:00.04)
    Sampler::StartPixelSample()                    0.00% (   0:00:00.01)
```

Vista Cenital

- Vista cenital utilizando bvh como estructura de aceleración

```
Máquina 1:~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/head/head.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
W0131 13:28:02.160392  4836 error.cpp:87] /home/angel/Escritorio/head/head.pbrt(35): Parameter "discarddegenerateUVs"
not used
Rendering: [++++++++++++++++++++++++++++++++++++++++++++++++++]  (2243.0s)
Statistics:
  BVH
    Interior nodes                                16201
    Leaf nodes                                    16202
    Primitives per leaf node                  17674 /        16202 (1.09x)
  Integrator
    Camera rays traced                          1035468800
    Path length                                 0.433 avg [range 0 - 2]
    Zero-radiance paths                     111469962 /    524385448 (21.26%)
  Intersections
    Regular ray intersection tests              2671101760
    Shadow ray intersection tests                621643405
    Ray-triangle intersection tests         1223196466 /  10442067711 (11.71%)
  Memory
    BVH tree                                    1.26 MiB
    Film pixels                                 7.71 MiB
    Texture MIP maps                            192.00 MiB
    Triangle meshes                             1.56 MiB
  Scene
    Lights                                      1
    Materials created                           2
    Shapes created                              17674
    Triangles per triangle mesh               17674 /           1 (17674.00x)
  Texture
    EWA lookups                                 524385448
    Trilinear lookups                           1695880627
  Profile
    Integrator::Render()                          99.92% (   0:37:24.37)
      Camera::GenerateRay[Differential]()                   1.66% (   0:00:37.20)
      Film::AddSample()                           0.71% (   0:00:16.03)
      Film::MergeTile()                           0.00% (   0:00:00.00)
      Sampler::GetSample[12]D()                         3.20% (   0:01:11.81)
      Sampler::StartPixelSample()                       0.00% (   0:00:00.01)
      SamplerIntegrator::Li()                     92.80% (   0:34:44.38)
        Accelerator::Intersect()                  11.76% (   0:04:24.22)
          Triangle::Intersect()                   3.27% (   0:01:13.39)
        BSDF::Sample_f()                            5.25% (   0:01:57.89)
        BSSRDF::Sample_f()                          0.13% (   0:00:02.91)
```

```
      BSSRDF::f()                                 13.22% (   0:04:56.97)
        BSSRDF::Sample_f()                        13.22% (   0:04:56.97)
          Accelerator::Intersect()                 6.84% (   0:02:33.70)
            Triangle::Intersect()                  1.90% (   0:00:42.68)
      Direct lighting                             50.91% (   0:19:03.45)
        Accelerator::Intersect()                  10.22% (   0:03:49.51)
          Triangle::Intersect()                    2.54% (   0:00:57.01)
        Accelerator::IntersectP()                  9.95% (   0:03:43.58)
          Triangle::IntersectP()                   1.81% (   0:00:40.60)
        BSDF::PDF()                                1.00% (   0:00:22.50)
        BSDF::Sample_f()                           5.31% (   0:01:59.29)
        BSDF::f()                                  1.79% (   0:00:40.17)
        Light::Pdf()                               3.50% (   0:01:18.56)
        Light::Sample_*()                         11.65% (   0:04:21.68)
          MIPMap::Lookup() (trilinear)             3.39% (   0:01:16.09)
        MIPMap::Lookup() (trilinear)               1.76% (   0:00:39.56)
        Sampler::GetSample[12]D()                  2.04% (   0:00:45.72)
      MIPMap::Lookup() (trilinear)                 1.17% (   0:00:26.17)
      Material::ComputeScatteringFunctions()       5.63% (   0:02:06.42)
        MIPMap::Lookup() (EWA)                     2.56% (   0:00:57.46)
      Sampler::GetSample[12]D()                    1.39% (   0:00:31.30)
    Scene parsing and creation                     0.08% (   0:00:01.80)
    Acceleration structure creation                0.00% (   0:00:00.00)
    MIP map generation                             0.00% (   0:00:00.06)
    MIPMap::Lookup() (trilinear)                   0.04% (   0:00:00.98)
    Texture loading                                0.02% (   0:00:00.41)
      MIP map generation                           0.00% (   0:00:00.03)
  Profile (flattened)
    Accelerator::Intersect()                      21.12% (   0:07:54.33)
    BSDF::Sample_f()                              10.56% (   0:03:57.19)
    Light::Sample_*()                              8.26% (   0:03:05.59)
    Accelerator::IntersectP()                      8.15% (   0:03:02.98)
    Triangle::Intersect()                          7.71% (   0:02:53.10)
    Sampler::GetSample[12]D()                      6.63% (   0:02:28.84)
    BSSRDF::Sample_f()                             6.51% (   0:02:26.18)
    MIPMap::Lookup() (trilinear)                   6.36% (   0:02:22.81)
    Direct lighting                                3.69% (   0:01:22.82)
    Light::Pdf()                                   3.50% (   0:01:18.56)
    SamplerIntegrator::Li()                        3.34% (   0:01:15.02)
    Material::ComputeScatteringFunctions()         3.07% (   0:01:08.96)
    MIPMap::Lookup() (EWA)                         2.56% (   0:00:57.46)
    Triangle::IntersectP()                         1.81% (   0:00:40.60)
    BSDF::f()                                      1.79% (   0:00:40.17)
    Camera::GenerateRay[Differential]()            1.66% (   0:00:37.20)
    Integrator::Render()                           1.55% (   0:00:34.91)
    BSDF::PDF()                                    1.00% (   0:00:22.50)
    Film::AddSample()                              0.71% (   0:00:16.03)
    Texture loading                                0.02% (   0:00:00.37)
    Scene parsing and creation                     0.01% (   0:00:00.32)
    MIP map generation                             0.00% (   0:00:00.10)
    Sampler::StartPixelSample()                    0.00% (   0:00:00.01)
    Acceleration structure creation                0.00% (   0:00:00.00)
    Film::MergeTile()                              0.00% (   0:00:00.00)
```

- Vista cenital utilizando kd-tree como estructura de aceleración

```
Máquina 1:~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/head_kdtree/head.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
W0131 14:19:04.683825  5083 error.cpp:87] /home/angel/Escritorio/head_kdtree/head.pbrt(37): Parameter
```

```
"discarddegenerateUVs" not used
Rendering: [++++++++++++++++++++++++++++++++++++++++++++++++++]  (2617.3s)
Statistics:
  Integrator
    Camera rays traced                                1035468800
    Path length                                       0.433 avg [range 0 - 2]
    Zero-radiance paths                  111469952 /    524385446 (21.26%)
  Intersections
    Regular ray intersection tests                    2671101777
    Shadow ray intersection tests                      621643399
    Ray-triangle intersection tests     2253767224 /  32642227562 (6.90%)
  Memory
    Film pixels                                       7.71 MiB
    Texture MIP maps                                  192.00 MiB
    Triangle meshes                                   1.56 MiB
  Scene
    Lights                                            1
    Materials created                                 2
    Shapes created                                    17674
    Triangles per triangle mesh               17674 /          1 (17674.00x)
  Texture
    EWA lookups                                       524385446
    Trilinear lookups                                 1695880637
  Profile
    Integrator::Render()                                99.93% (   0:43:38.75)
      Camera::GenerateRay[Differential]()                1.35% (   0:00:35.36)
      Film::AddSample()                                  0.63% (   0:00:16.51)
      Sampler::GetSample[12]D()                          2.69% (   0:01:10.58)
      Sampler::StartPixelSample()                        0.00% (   0:00:00.05)
      SamplerIntegrator::Li()                           93.97% (   0:41:02.60)
        Accelerator::Intersect()                        14.31% (   0:06:14.88)
          Triangle::Intersect()                         6.49% (   0:02:50.15)
        BSDF::Sample_f()                                4.43% (   0:01:56.12)
        BSSRDF::Sample_f()                              0.09% (   0:00:02.46)
        BSSRDF::f()                                    14.27% (   0:06:13.84)
          BSSRDF::Sample_f()                           14.27% (   0:06:13.84)
            Accelerator::Intersect()                    8.91% (   0:03:53.62)
              Triangle::Intersect()                     3.79% (   0:01:39.21)
        Direct lighting                                51.40% (   0:22:27.14)
          Accelerator::Intersect()                     12.53% (   0:05:28.49)
            Triangle::Intersect()                       4.69% (   0:02:02.90)
          Accelerator::IntersectP()                    13.69% (   0:05:58.73)
            Triangle::IntersectP()                      3.77% (   0:01:38.90)
          BSDF::PDF()                                   0.79% (   0:00:20.68)
          BSDF::Sample_f()                              4.46% (   0:01:56.91)
          BSDF::f()                                     1.52% (   0:00:39.70)
          Light::Pdf()                                  2.83% (   0:01:14.27)
          Light::Sample_*()                             9.47% (   0:04:08.19)
            MIPMap::Lookup() (trilinear)                2.77% (   0:01:12.70)
          MIPMap::Lookup() (trilinear)                  1.43% (   0:00:37.44)
          Sampler::GetSample[12]D()                     1.62% (   0:00:42.46)
        MIPMap::Lookup() (trilinear)                    1.00% (   0:00:26.27)
        Material::ComputeScatteringFunctions()          4.61% (   0:02:00.84)
          MIPMap::Lookup() (EWA)                        2.09% (   0:00:54.67)
        Sampler::GetSample[12]D()                       1.11% (   0:00:29.00)
    Scene parsing and creation                          0.07% (   0:00:01.90)
      Acceleration structure creation                   0.00% (   0:00:00.03)
      MIP map generation                                0.00% (   0:00:00.06)
      MIPMap::Lookup() (trilinear)                      0.04% (   0:00:00.99)
      Texture loading                                   0.02% (   0:00:00.41)
        MIP map generation                              0.00% (   0:00:00.02)
  Profile (flattened)
    Accelerator::Intersect()                           20.79% (   0:09:04.73)
    Triangle::Intersect()                              14.97% (   0:06:32.27)
    Accelerator::IntersectP()                           9.91% (   0:04:19.83)
    BSDF::Sample_f()                                    8.89% (   0:03:53.03)
    Light::Sample_*()                                   6.70% (   0:02:55.48)
    BSSRDF::Sample_f()                                  5.44% (   0:02:22.68)
    Sampler::GetSample[12]D()                           5.42% (   0:02:22.05)
    MIPMap::Lookup() (trilinear)                        5.24% (   0:02:17.42)
```

```
Triangle::IntersectP()                          3.77% (   0:01:38.90)
Direct lighting                                 3.06% (   0:01:20.21)
Light::Pdf()                                    2.83% (   0:01:14.27)
SamplerIntegrator::Li()                         2.75% (   0:01:12.01)
Material::ComputeScatteringFunctions()          2.53% (   0:01:06.17)
MIPMap::Lookup() (EWA)                          2.09% (   0:00:54.67)
BSDF::f()                                       1.52% (   0:00:39.70)
Camera::GenerateRay[Differential]()             1.35% (   0:00:35.36)
Integrator::Render()                            1.28% (   0:00:33.62)
BSDF::PDF()                                     0.79% (   0:00:20.68)
Film::AddSample()                               0.63% (   0:00:16.51)
Scene parsing and creation                      0.02% (   0:00:00.40)
Texture loading                                 0.01% (   0:00:00.38)
MIP map generation                              0.00% (   0:00:00.08)
Sampler::StartPixelSample()                     0.00% (   0:00:00.05)
Acceleration structure creation                 0.00% (   0:00:00.03)
```

lte-orb/lte-orb-roughglass.pbrt

Vista Original

- Vista original utilizando bvh como estructura de aceleración

```
Máquina 1:~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/lte-orb/lte-orb-roughglass.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
Rendering:
[++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++] (47046.3s)
```

```
Statistics:
  BVH
    Interior nodes                                478658
    Leaf nodes                                    478659
    Primitives per leaf node                 597810 /       478659 (1.25x)
  Integrator
    Camera rays traced                           5242880000
    Path length                                  2.718 avg [range 0 - 10]
    Zero-radiance paths                     8702171337 /  15320394644 (56.80%)
  Intersections
    Regular ray intersection tests              19755623443
    Shadow ray intersection tests               12659643650
    Ray-triangle intersection tests          23099707657 / 183246447102 (12.61%)
  Memory
    BVH tree                                    38.34 MiB
    Film pixels                                 19.53 MiB
    Texture MIP maps                              16.00 MiB
    Triangle meshes                             50.52 MiB
  Scene
    AreaLights                                   2
    Lights                                      2
    Materials created                              8
    Shapes created                              597810
    Triangles per triangle mesh              597810 /           7 (85401.43x)
  SpatialLightDistribution
    Distributions created                          5318
    Hash probes per lookup                         1.000 avg [range 1 - 2]
    Lookups per distribution                15320394644 /         5318 (2880856.46x)
  Texture
    EWA lookups                                 5201972198
  Profile
    Integrator::Render()                          100.00% (  13:04:08.40)
      Camera::GenerateRay[Differential]()                  0.38% (   0:02:59.15)
      Film::AddSample()                           0.23% (   0:01:46.03)
      Film::MergeTile()                           0.00% (   0:00:00.00)
      Sampler::GetSample[12]D()                         1.38% (   0:10:47.42)
      Sampler::StartPixelSample()                       0.00% (   0:00:00.02)
      SamplerIntegrator::Li()                     97.16% (  12:41:53.46)
        Accelerator::Intersect()                  27.80% (   3:37:58.09)
          Triangle::Intersect()                   6.21% (   0:48:41.68)
        BSDF::Sample_f()                          16.77% (   2:11:32.35)
        Direct lighting                           46.81% (   6:07:04.05)
          Accelerator::Intersect()                 0.31% (   0:02:24.33)
            Triangle::Intersect()                 0.08% (   0:00:36.12)
          Accelerator::IntersectP()               13.86% (   1:48:42.80)
            Triangle::IntersectP()                2.54% (   0:19:53.39)
          BSDF::PDF()                             3.52% (   0:27:35.47)
          BSDF::Sample_f()                        17.32% (   2:15:51.05)
          BSDF::f()                               5.29% (   0:41:28.56)
          Light::Pdf()                            1.17% (   0:09:09.33)
            Triangle::Intersect()                 0.53% (   0:04:09.96)
          Light::Sample_*()                       1.06% (   0:08:19.10)
          Sampler::GetSample[12]D()                     1.84% (   0:14:26.16)
        Material::ComputeScatteringFunctions()                2.44% (   0:19:10.27)
          MIPMap::Lookup() (EWA)                  1.14% (   0:08:57.18)
        Sampler::GetSample[12]D()                 0.82% (   0:06:26.47)
        SpatialLightDistribution lookup           0.57% (   0:04:29.62)
          SpatialLightDistribution creation       0.00% (   0:00:00.06)
            Light::Sample_*()                     0.00% (   0:00:00.02)
    Scene parsing and creation                          0.00% (   0:00:00.96)
      Acceleration structure creation                   0.00% (   0:00:00.45)
      Texture loading                             0.00% (   0:00:00.04)
        MIP map generation                          0.00% (   0:00:00.01)
  Profile (flattened)
    BSDF::Sample_f()                              34.10% (   4:27:23.41)
    Accelerator::Intersect()                      21.82% (   2:51:04.62)
    Accelerator::IntersectP()                     11.33% (   1:28:49.40)
    Triangle::Intersect()                         6.82% (   0:53:27.77)
    BSDF::f()                                     5.29% (   0:41:28.56)
    Sampler::GetSample[12]D()                           4.04% (   0:31:40.05)
```

```
  BSDF::PDF()                                  3.52% (   0:27:35.47)
  Triangle::IntersectP()                       2.54% (   0:19:53.39)
  Direct lighting                              2.44% (   0:19:07.20)
  SamplerIntegrator::Li()                      1.94% (   0:15:12.58)
  Material::ComputeScatteringFunctions()       1.30% (   0:10:13.09)
  MIPMap::Lookup() (EWA)                       1.14% (   0:08:57.18)
  Light::Sample_*()                            1.06% (   0:08:19.12)
  Integrator::Render()                         0.86% (   0:06:42.30)
  Light::Pdf()                                 0.64% (   0:04:59.37)
  SpatialLightDistribution lookup              0.57% (   0:04:29.55)
  Camera::GenerateRay[Differential]()          0.38% (   0:02:59.15)
  Film::AddSample()                            0.23% (   0:01:46.03)
  Scene parsing and creation                   0.00% (   0:00:00.46)
  Acceleration structure creation              0.00% (   0:00:00.45)
  SpatialLightDistribution creation            0.00% (   0:00:00.03)
  Texture loading                              0.00% (   0:00:00.03)
  Sampler::StartPixelSample()                  0.00% (   0:00:00.02)
  MIP map generation                           0.00% (   0:00:00.01)
  Film::MergeTile()                            0.00% (   0:00:00.00)
```

- Vista original utilizando kd-tree como estructura de aceleración

```
Máquina 1:~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/lte-orb_kdtree/lte-orb-roughglass.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
Rendering:
[++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++]  (64350.5s)
Statistics:
  Integrator
    Camera rays traced                         5242880000
    Path length                                2.718 avg [range 0 - 10]
    Zero-radiance paths                        8702171508 /  15320394733 (56.80%)
  Intersections
    Regular ray intersection tests             19755623506
    Shadow ray intersection tests              12659643674
    Ray-triangle intersection tests            35615319625 / 844210120869 (4.22%)
  Memory
    Film pixels                                19.53 MiB
    Texture MIP maps                           16.00 MiB
    Triangle meshes                            50.52 MiB
  Scene
    AreaLights                                 2
    Lights                                     2
    Materials created                          8
    Shapes created                             597810
    Triangles per triangle mesh                597810 /          7 (85401.43x)
  SpatialLightDistribution
    Distributions created                      5318
    Hash probes per lookup                     1.000 avg [range 1 - 2]
    Lookups per distribution                   15320394733 /        5318 (2880856.47x)
  Texture
    EWA lookups                                5201972174
  Profile
    Integrator::Render()                       100.00% (  17:52:34.68)
      Camera::GenerateRay[Differential]()      0.29% (   0:03:06.75)
      Film::AddSample()                        0.17% (   0:01:51.73)
      Film::MergeTile()                        0.00% (   0:00:00.00)
      Sampler::GetSample[12]D()                1.02% (   0:10:54.22)
      Sampler::StartPixelSample()              0.00% (   0:00:00.05)
```

```
    SamplerIntegrator::Li()                          97.87% (  17:29:45.07)
      Accelerator::Intersect()                       37.78% (   6:45:11.38)
        Triangle::Intersect()                        13.87% (   2:28:45.88)
      BSDF::Sample_f()                               12.69% (   2:16:06.87)
      Direct lighting                                42.76% (   7:38:41.61)
        Accelerator::Intersect()                      0.33% (   0:03:34.79)
          Triangle::Intersect()                       0.12% (   0:01:14.43)
        Accelerator::IntersectP()                    17.27% (   3:05:13.52)
          Triangle::IntersectP()                      4.81% (   0:51:37.42)
        BSDF::PDF()                                   2.66% (   0:28:33.64)
        BSDF::Sample_f()                             13.21% (   2:21:42.82)
        BSDF::f()                                     4.12% (   0:44:13.50)
        Light::Pdf()                                  0.98% (   0:10:30.29)
          Triangle::Intersect()                       0.43% (   0:04:34.68)
        Light::Sample_*()                             0.83% (   0:08:50.97)
        Sampler::GetSample[12]D()                     1.36% (   0:14:37.61)
      Material::ComputeScatteringFunctions()          1.95% (   0:20:55.37)
        MIPMap::Lookup() (EWA)                        0.88% (   0:09:25.67)
      Sampler::GetSample[12]D()                       0.63% (   0:06:45.63)
      SpatialLightDistribution lookup                 0.49% (   0:05:13.60)
        SpatialLightDistribution creation             0.00% (   0:00:00.05)
          Light::Sample_*()                           0.00% (   0:00:00.02)
    Scene parsing and creation                        0.00% (   0:00:01.95)
      Acceleration structure creation                 0.00% (   0:00:01.55)
      Texture loading                                 0.00% (   0:00:00.02)
        MIP map generation                            0.00% (   0:00:00.00)
  Profile (flattened)
    BSDF::Sample_f()                                 25.90% (   4:37:49.70)
    Accelerator::Intersect()                         24.12% (   4:18:45.86)
    Triangle::Intersect()                            14.41% (   2:34:35.00)
    Accelerator::IntersectP()                        12.46% (   2:13:36.09)
    Triangle::IntersectP()                            4.81% (   0:51:37.42)
    BSDF::f()                                         4.12% (   0:44:13.50)
    Sampler::GetSample[12]D()                         3.01% (   0:32:17.47)
    BSDF::PDF()                                       2.66% (   0:28:33.64)
    Direct lighting                                   2.00% (   0:21:24.42)
    SamplerIntegrator::Li()                           1.57% (   0:16:50.58)
    Material::ComputeScatteringFunctions()            1.07% (   0:11:29.70)
    MIPMap::Lookup() (EWA)                            0.88% (   0:09:25.67)
    Light::Sample_*()                                 0.83% (   0:08:51.00)
    Integrator::Render()                              0.65% (   0:06:56.83)
    Light::Pdf()                                      0.55% (   0:05:55.61)
    SpatialLightDistribution lookup                   0.49% (   0:05:13.54)
    Camera::GenerateRay[Differential]()               0.29% (   0:03:06.75)
    Film::AddSample()                                 0.17% (   0:01:51.73)
    Acceleration structure creation                   0.00% (   0:00:01.55)
    Scene parsing and creation                        0.00% (   0:00:00.37)
    Sampler::StartPixelSample()                       0.00% (   0:00:00.05)
    SpatialLightDistribution creation                 0.00% (   0:00:00.02)
    Texture loading                                   0.00% (   0:00:00.01)
    MIP map generation                                0.00% (   0:00:00.00)
    Film::MergeTile()                                 0.00% (   0:00:00.00)
```

Vista Cenital

- Vista cenital utilizando bvh como estructura de aceleración

```
Máquina 1:~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/lte-orb/lte-orb-roughglass.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
Rendering:
[++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++]  (19118.8s)
Statistics:
  BVH
    Interior nodes                          478658
    Leaf nodes                              478659
    Primitives per leaf node            597810 /       478659 (1.25x)
  Integrator
    Camera rays traced                       5242880000
    Path length                             1.595 avg [range 0 - 10]
    Zero-radiance paths               2562901928 /   8628456592 (29.70%)
  Intersections
    Regular ray intersection tests                14061502712
    Shadow ray intersection tests                  7300715832
    Ray-triangle intersection tests         11067265478 /  67995260489 (16.28%)
  Memory
    BVH tree                                38.34 MiB
    Film pixels                             19.53 MiB
    Texture MIP maps                             16.00 MiB
    Triangle meshes                            50.52 MiB
  Scene
    AreaLights                                 2
    Lights                                   2
    Materials created                             8
```

```
  Shapes created                                597810
  Triangles per triangle mesh          597810 /          7 (85401.43x)
SpatialLightDistribution
  Distributions created                         5318
  Hash probes per lookup                        1.001 avg [range 1 - 2]
  Lookups per distribution          8628456592 /       5318 (1622500.30x)
Texture
  EWA lookups                                5713717057
Profile
  Integrator::Render()                        100.00% (   5:18:40.47)
    Camera::GenerateRay[Differential]()         0.98% (   0:03:06.74)
    Film::AddSample()                           0.52% (   0:01:38.83)
    Film::MergeTile()                           0.00% (   0:00:00.00)
    Sampler::GetSample[12]D()                   3.54% (   0:11:15.94)
    Sampler::StartPixelSample()                 0.00% (   0:00:00.04)
    SamplerIntegrator::Li()                    92.95% (   4:56:13.00)
      Accelerator::Intersect()                 24.63% (   1:18:28.88)
        Triangle::Intersect()                   6.53% (   0:20:48.98)
      BSDF::Sample_f()                         13.66% (   0:43:32.15)
      Direct lighting                          43.56% (   2:18:48.36)
        Accelerator::Intersect()                0.58% (   0:01:51.84)
          Triangle::Intersect()                 0.20% (   0:00:37.41)
        Accelerator::IntersectP()              10.76% (   0:34:17.54)
          Triangle::IntersectP()                2.09% (   0:06:39.45)
        BSDF::PDF()                             3.21% (   0:10:14.39)
        BSDF::Sample_f()                       13.97% (   0:44:32.05)
        BSDF::f()                               4.95% (   0:15:46.67)
        Light::Pdf()                            1.68% (   0:05:21.46)
          Triangle::Intersect()                 0.83% (   0:02:38.73)
        Light::Sample_*()                       1.62% (   0:05:09.21)
        Sampler::GetSample[12]D()               3.11% (   0:09:55.31)
      Material::ComputeScatteringFunctions()    6.09% (   0:19:25.31)
        MIPMap::Lookup() (EWA)                  3.23% (   0:10:18.02)
      Sampler::GetSample[12]D()                 1.24% (   0:03:56.28)
      SpatialLightDistribution lookup           0.77% (   0:02:27.35)
        SpatialLightDistribution creation       0.00% (   0:00:00.06)
          Light::Sample_*()                     0.00% (   0:00:00.04)
  Scene parsing and creation                    0.00% (   0:00:00.75)
    Acceleration structure creation             0.00% (   0:00:00.38)
    Texture loading                             0.00% (   0:00:00.02)
      MIP map generation                        0.00% (   0:00:00.00)
Profile (flattened)
  BSDF::Sample_f()                             27.64% (   1:28:04.20)
  Accelerator::Intersect()                     18.48% (   0:58:54.32)
  Accelerator::IntersectP()                     8.67% (   0:27:38.08)
  Sampler::GetSample[12]D()                     7.88% (   0:25:07.54)
  Triangle::Intersect()                         7.56% (   0:24:05.13)
  BSDF::f()                                     4.95% (   0:15:46.67)
  Direct lighting                               3.66% (   0:11:39.86)
  MIPMap::Lookup() (EWA)                        3.23% (   0:10:18.02)
  BSDF::PDF()                                   3.21% (   0:10:14.39)
  SamplerIntegrator::Li()                       3.01% (   0:09:34.65)
  Material::ComputeScatteringFunctions()        2.86% (   0:09:07.29)
  Triangle::IntersectP()                        2.09% (   0:06:39.45)
  Integrator::Render()                          2.02% (   0:06:25.89)
  Light::Sample_*()                             1.62% (   0:05:09.25)
  Camera::GenerateRay[Differential]()           0.98% (   0:03:06.74)
  Light::Pdf()                                  0.85% (   0:02:42.72)
  SpatialLightDistribution lookup               0.77% (   0:02:27.28)
  Film::AddSample()                             0.52% (   0:01:38.83)
  Acceleration structure creation               0.00% (   0:00:00.38)
  Scene parsing and creation                    0.00% (   0:00:00.35)
  Sampler::StartPixelSample()                   0.00% (   0:00:00.04)
  SpatialLightDistribution creation             0.00% (   0:00:00.02)
  Texture loading                               0.00% (   0:00:00.01)
  Film::MergeTile()                             0.00% (   0:00:00.00)
  MIP map generation                            0.00% (   0:00:00.00)
```

- Vista cenital utilizando kd-tree como estructura de aceleración

```
Máquina1:~/igm/pbrt-v3/build$ ./pbrt /home/angel/Escritorio/lte-orb_kdtree/lte-orb-roughglass.pbrt
pbrt version 3 (built Nov 20 2017 at 19:53:06) [Detected 4 cores]
Copyright (c)1998-2016 Matt Pharr, Greg Humphreys, and Wenzel Jakob.
The source code to pbrt (but *not* the book contents) is covered by the BSD License.
See the file LICENSE.txt for the conditions of the license.
Rendering:
[++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++] (46123.7s)
Statistics:
  Integrator
    Camera rays traced                          5242880000
    Path length                                 1.595 avg [range 0 - 10]
    Zero-radiance paths                         2562902025 /   8628456655 (29.70%)
  Intersections
    Regular ray intersection tests              14061502774
    Shadow ray intersection tests               7300715872
    Ray-triangle intersection tests             15721232782 / 425209556080 (3.70%)
  Memory
    Film pixels                                 19.53 MiB
    Texture MIP maps                            16.00 MiB
    Triangle meshes                             50.52 MiB
  Scene
    AreaLights                                  2
    Lights                                      2
    Materials created                           8
    Shapes created                              597810
    Triangles per triangle mesh                 597810 /          7 (85401.43x)
  SpatialLightDistribution
    Distributions created                       5318
    Hash probes per lookup                      1.001 avg [range 1 - 2]
    Lookups per distribution                    8628456655 /        5318 (1622500.31x)
  Texture
    EWA lookups                                 5713717042
  Profile
    Integrator::Render()                        99.99% (  12:48:46.39)
      Camera::GenerateRay[Differential]()       0.73% (   0:05:35.60)
      Film::AddSample()                         0.43% (   0:03:19.05)
      Sampler::GetSample[12]D()                 2.60% (   0:19:57.72)
      Sampler::StartPixelSample()               0.00% (   0:00:00.12)
      SamplerIntegrator::Li()                   94.78% (  12:08:41.69)
        Accelerator::Intersect()                37.36% (   4:47:13.63)
          Triangle::Intersect()                 16.38% (   2:05:57.45)
        BSDF::Sample_f()                        9.98% (   1:16:44.28)
        Direct lighting                         38.94% (   4:59:23.07)
          Accelerator::Intersect()              0.76% (   0:05:52.08)
            Triangle::Intersect()               0.35% (   0:02:42.13)
          Accelerator::IntersectP()             14.64% (   1:52:34.96)
            Triangle::IntersectP()              5.08% (   0:39:05.10)
          BSDF::PDF()                           2.24% (   0:17:14.41)
          BSDF::Sample_f()                      10.26% (   1:18:53.14)
          BSDF::f()                             3.64% (   0:28:01.23)
          Light::Pdf()                          1.25% (   0:09:37.27)
            Triangle::Intersect()               0.62% (   0:04:47.76)
          Light::Sample_*()                     1.17% (   0:09:01.06)
          Sampler::GetSample[12]D()             2.23% (   0:17:07.86)
        Material::ComputeScatteringFunctions()  4.74% (   0:36:28.45)
          MIPMap::Lookup() (EWA)                2.55% (   0:19:37.88)
        Sampler::GetSample[12]D()               0.87% (   0:06:43.12)
        SpatialLightDistribution lookup         0.63% (   0:04:51.87)
          SpatialLightDistribution creation     0.00% (   0:00:00.12)
            Light::Sample_*()                   0.00% (   0:00:00.07)
    Scene parsing and creation                  0.01% (   0:00:03.40)
```

```
    Acceleration structure creation                 0.01% (   0:00:02.71)
    Texture loading                                 0.00% (   0:00:00.03)
      MIP map generation                            0.00% (   0:00:00.01)
Profile (flattened)
  Accelerator::Intersect()                         21.39% (   2:44:26.13)
  BSDF::Sample_f()                                 20.24% (   2:35:37.43)
  Triangle::Intersect()                            17.36% (   2:13:27.35)
  Accelerator::IntersectP()                         9.56% (   1:13:29.85)
  Sampler::GetSample[12]D()                         5.70% (   0:43:48.70)
  Triangle::IntersectP()                            5.08% (   0:39:05.10)
  BSDF::f()                                         3.64% (   0:28:01.23)
  Direct lighting                                   2.73% (   0:21:01.03)
  MIPMap::Lookup() (EWA)                            2.55% (   0:19:37.88)
  SamplerIntegrator::Li()                           2.25% (   0:17:17.24)
  BSDF::PDF()                                       2.24% (   0:17:14.41)
  Material::ComputeScatteringFunctions()            2.19% (   0:16:50.56)
  Integrator::Render()                              1.46% (   0:11:12.19)
  Light::Sample_*()                                 1.17% (   0:09:01.13)
  Camera::GenerateRay[Differential]()               0.73% (   0:05:35.60)
  SpatialLightDistribution lookup                   0.63% (   0:04:51.74)
  Light::Pdf()                                      0.63% (   0:04:49.50)
  Film::AddSample()                                 0.43% (   0:03:19.05)
  Acceleration structure creation                   0.01% (   0:00:02.71)
  Scene parsing and creation                        0.00% (   0:00:00.64)
  Sampler::StartPixelSample()                       0.00% (   0:00:00.12)
  SpatialLightDistribution creation                 0.00% (   0:00:00.04)
  Texture loading                                   0.00% (   0:00:00.02)
  MIP map generation                                0.00% (   0:00:00.01)
```

Conclusión

Vista original

BVH

	Head	**Lte-Orb-Roughglass**
Tiempo total	0:47:14.53	13:04:08.40
Consumo de memoria	202.53MB	124,39MB
Tiempo direct lightning	0:24:06.12	6:07:04.05

Kd-tree

	Head	**Lte-Orb-Roughglass**
Tiempo total	0:56:59.63	17:52:34.68
Consumo de memoria	*	*
Tiempo direct lightning	0:22:27.14	0:21:24.42

*Kd-tree no proporciona datos de consumo de memoria

Conclusiones

Se ha seleccionado el tiempo de Direct Lighting como parámetro para la comparativa debido a la gran variabilidad que presenta.

Para la figura head, utilizando kd-tree como estructura de aceleración se observa un aumento del tiempo total de renderizado de un 17,11% respecto a bvh y una disminución del tiempo total dedicado al Direct Lighting de un 8,15%.

Por otra parte, para la figura Lte-Orb-Roughglass, utilizando kd-tree como estructura de aceleración se observa un aumento del tiempo total de renderizado de un 26,81% respecto a bvh y una disminución del tiempo total dedicado al Direct Lighting de un 1615,26%.

Vista cenital

BVH

	Head	**Lte-Orb-Roughglass**
Tiempo total	0:37:24.37	5:18:40.47
Consumo de memoria	202.53MB	124,39MB
Tiempo direct lightning	0:19:03.45	2:18:48.36

Kd-tree

	Head	**Lte-Orb-Roughglass**
Tiempo total	0:43:38.75	12:48:46.39
Consumo de memoria	*	*
Tiempo direct lightning	0:22:27.14	4:59:23.07

*Kd-tree no proporciona datos de consumo de memoria

Conclusiones

Para la figura head, utilizando kd-tree como estructura de aceleración se observa un aumento del tiempo total de renderizado de un 14,28% respecto a bvh y una disminución del tiempo total dedicado al Direct Lighting de un 7,1%.

Por otra parte, para la figura Lte-Orb-Roughglass, utilizando kd-tree como estructura de aceleración se observa un aumento del tiempo total de renderizado de un 241,24% respecto a bvh y un aumento del tiempo total dedicado al Direct Lighting de un 215,7%.

Conclusión final

Los resultados muestran que por norma general la estructura bvh es más eficiente que kd-tree teniendo en cuenta el tiempo total de render. Sin embargo, se observan mejoras en el tiempo dedicado a la etapa de direct lighting cuando utilizamos kd-tree como estructura de aceleración. Las mejoras en el resto de etapas pueden considerarse marginales o debido al poco cambio en los tiempos entre ambas estructuras de aceleración.