Nanyang Technological University

Lab 4 Report: Implicit Solids

CZ2003 Computer Graphics and Visualization

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| File: CSGsolid.wrl  cylinder=min(min(0.5^2-x^2-z^2,y),0.65-y);  cylinder1=min(min(0.7^2-x^2-z^2,y),0.2-y);    hollowCylinder =min(min(0.45^2-x^2-z^2,y),0.5-y);    cone=min(((y-1)^2 - (z/0.2)^2 - (x/0.2 + 2.8)^2)-0.5,y/0.4 - 0.5);  cone1=min(((y-1)^2 - (z/0.2)^2 - (x/0.2 - 2.8)^2)-0.5,y/0.4 - 0.5);  combinedHorn = max(cone,cone1);    combinedCylinder= max(cylinder, cylinder1);  combinedHCylinder = min(combinedCylinder, -hollowCylinder);  combinedHwHwCylinder = max(combinedHCylinder, combinedHorn);    ellipsoid=min((1-(x/0.5)^2-(y/0.45)^2-(z/0.55)^2),-y);  ellipsoid1=min((1-(x/0.45)^2-(y/0.5)^2-(z/0.5)^2),y);  combinedF = max(ellipsoid, ellipsoid1);  combinedFnHw2C = max(combinedF, combinedHwHwCylinder);    rectangle = 0.1^4 - (x/0.8)^4 - (y/0.2 - 2.2)^4 - (z-0.45)^4;  rectangle1 = 0.1^4 - (x/0.2)^4 - (y/0.8 - 0.55)^4 - (z-0.45)^4;    combinedCross = max(rectangle, rectangle1);  combinedCnFnHw2C = max(combinedFnHw2C, combinedCross);      cylinder2=min(min(0.05^2 - (x+0.7)^2 - z^2, y-0.5), 0.7 - y);  sphere=0.05^2-(x+0.7)^2-(y-0.7)^2-z^2;  combinedcs1 = max(cylinder2, sphere);    cylinder3=min(min(0.05^2 - (x+0.7)^2 - (z-0.1)^2, y-0.5), 0.7 - y);  sphere1=0.05^2-(x+0.7)^2-(y-0.7)^2-(z-0.1)^2;  combinedcs2 = max(cylinder3, sphere1);  cylinder4=min(min(0.05^2 - (x+0.7)^2 - (z-0.2)^2, y-0.5), 0.7 - y);  sphere2=0.05^2-(x+0.7)^2-(y-0.7)^2-(z-0.2)^2;  combinedcs3 = max(cylinder4, sphere2);    cylinder5=min(min(0.05^2 - (x+0.7)^2 - (z-0.4)^2, y-0.5), 0.7 - y);  sphere3=0.05^2-(x+0.7)^2-(y-0.7)^2-(z-0.4)^2;  combinedcs4 = max(cylinder5, sphere3);    cylinder6=min(min(0.05^2 - (x+0.7)^2 - (z-0.5)^2, y-0.5), 0.7 - y);  sphere4=0.05^2-(x+0.7)^2-(y-0.7)^2-(z-0.5)^2;  combinedcs5 = max(cylinder6, sphere4);    joint = min(min(0.05^2 - (x+0.7)^2 - (y-0.5)^2, z+0.05), 0.56-z);  combinedcs = max(max(max(max(combinedcs1, combinedcs2), combinedcs3), combinedcs4),combinedcs5);    joint1 = min(min(0.05^2 - (x+0.7)^2 - (z-0.3)^2, 0.5-y), y-0.3);    joint2 = min(min(0.05^2 - (z-0.3)^2 - (y-0.3)^2, 0.755+x), -x);    combinedjcs = max(combinedcs, joint);  combinedj2cs = max(combinedjcs, joint1);  combinedj3cs = max(combinedj2cs, joint2);    cylindera=min(min(0.05^2 - (x-0.7)^2 - z^2, y-0.5), 0.7 - y);  spherea=0.05^2-(x-0.7)^2-(y-0.7)^2-z^2;  combinedcs1a = max(cylindera, spherea);    cylinderb=min(min(0.05^2 - (x-0.7)^2 - (z-0.1)^2, y-0.5), 0.7 - y);  sphereb=0.05^2-(x-0.7)^2-(y-0.7)^2-(z-0.1)^2;  combinedcs2b = max(cylinderb, sphereb);    cylinderc=min(min(0.05^2 - (x-0.7)^2 - (z-0.2)^2, y-0.5), 0.7 - y);  spherec=0.05^2-(x-0.7)^2-(y-0.7)^2-(z-0.2)^2;  combinedcs3c = max(cylinderc, spherec);    cylinderd=min(min(0.05^2 - (x-0.7)^2 - (z-0.4)^2, y-0.5), 0.7 - y);  sphered=0.05^2-(x-0.7)^2-(y-0.7)^2-(z-0.4)^2;  combinedcs4d = max(cylinderd, sphered);    cylindere=min(min(0.05^2 - (x-0.7)^2 - (z-0.5)^2, y-0.5), 0.7 - y);  spheree=0.05^2-(x-0.7)^2-(y-0.7)^2-(z-0.5)^2;  combinedcs5e = max(cylindere, spheree);    jointa = min(min(0.05^2 - (x-0.7)^2 - (y-0.5)^2, z+0.05), 0.56-z);  combinedcsa = max(max(max(max(combinedcs1a, combinedcs2b), combinedcs3c), ombinedcs4d),combinedcs5e);    jointb = min(min(0.05^2 - (x-0.7)^2 - (z-0.3)^2, 0.5-y), y-0.3);  jointc = min(min(0.05^2 - (z-0.3)^2 - (y-0.3)^2, 0.755-x), x);    combinedjcsa = max(combinedcsa, jointa);  combinedj2csb = max(combinedjcsa, jointb);  combinedj3csc = max(combinedj2csb, jointc);  eyes1 = min(min(0.1^2 - (x-0.2)^2 - (y+0.05)^2, z+0.1), 0.55-z);  eyes2 = min(min(0.1^2 - (x+0.2)^2 - (y+0.05)^2, z+0.1), 0.55-z);  nose=min(((0.5/z)^2 - (x/0.3)^2 - (y/0.2 + 1)^2)-0.8, z-0.5);  combinednoseeyes = max(max(eyes1, eyes2),nose);    hat = max(max(combinedCnFnHw2C, combinedj3cs), combinedj3csc);  hat1 = max(hat, combinednoseeyes);  bboxCenter 0 0 0  bboxSize 2 2 2  resolution [70 70 70]  This implicit solid is consisting of 3 cones, 1 ellipse, 21 cylinders, 10 spheres, 2 planes. Each shapes is made with consideration if a certain shape is not there. For example, if you removed the face (ellipse and combinednoseeyes), you can see an actual hat shape. It is shaped after One Piece Chopper.  diffuseColor "r=cos(0.5\*u\*pi); g=sin(0.5\*v\*pi); b=0;" |
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| # Adjust the tight bounding box and an optimal resolution  bboxCenter 0 0 0  bboxSize 2 2 2  resolution [70 70 70]  diffuseColor "r=1; g=(v+1)/2; b=0;"  Transform {translation 0 0.15 0 children [  Shape {geometry Box {size 1.6 1.2 1.5}  appearance Appearance {material Material  {diffuseColor 0 1 1 transparency 0.5}}}]} |