

Test Cases

Note: the view of the bound triangulation is not included in the final system, but is included in the testing to point out possible errors. This debugging tool can be turned on by changing `DEBUG_BOUND_TESSELLATION` in `SurfaceToSTL` to 1.

Note: to make sure the tessellation is more accurate, use larger numbers and stretched surfaces

Used <http://www.wolframalpha.com/widgets/view.jsp?id=f708f36bc40c46f8db505d43ca92053b> to test what 3D surfaces should look like and <https://www.viewstl.com/> to see what the STL file actually produces.

| Inputs | Expected Results | Actual Results |
|---|--|--|
| Solid name: " " Solid name: "my solid" Equation $z=300$ Resolution: -1 Resolution: 2 Bound choice: p Bound choice: c Radius: 0 Radius: 100 Center point: a,3 Center point: a Center point: 1,3, Center point: 100, Center point: 100,100 | Invalid solid name, try again Accept solid name Accept equation Invalid resolution, try again Accept resolution Invalid bound choice, try again Accept bound choice (as c for circle) Invalid radius, try again Accept radius Invalid center point, try again Invalid center point, try again Invalid center point, try again Invalid center point, try again Accept center point 2D display of bound Output of ASCII my solid.stl Looks like cylinder | Invalid solid name, try again Accept solid name Accept equation Invalid resolution, try again Accept resolution Invalid bound choice, try again Accept bound choice (as c for circle) Invalid radius, try again Accept radius Invalid center point, try again Invalid center point, try again Invalid center point, try again Invalid center point, try again Accept center point 2D display of bound Output of ASCII my solid.stl Looks like cylinder |
| Solid name: "my solid" Equation $z=z$ Equation $z=xy+$ Equation $z=\ln(x$ Equation $z=\ln(x)+\pi$ Resolution: 9 Bound choice: circle Radius: must_be_number Radius: -100 Radius: 10 Center point: 11 , 11 | Accept solid name Invalid equation, try again Invalid equation, try again Invalid equation, try again Accept equation Accept resolution Accept bound choice (as c for circle) Invalid radius, try again Invalid radius, try again Accept radius Accept center point 2D display of bound Output of ASCII my solid(1).stl Looks like a cylinder with a tapered top toward one side. | Accept solid name Invalid equation, try again Invalid equation, try again Invalid equation, try again Accept equation Accept resolution Accept bound choice (as c for circle) Invalid radius, try again Invalid radius, try again Accept radius Accept center point 2D display of bound Output of ASCII my solid.stl Looks like a cylinder with a tapered top toward one side. |
| Solid name: "hemisphere" Equation $z=\sqrt{-x^2-y^2+81}$ Resolution: 7 Bound choice: circle Radius: 9 Center point: 0,0 | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point |

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| | 2D display of bound Output of ASCII hemisphere.stl Looks like a hemisphere. | 2D display of bound Output of ASCII hemisphere.stl Looks like a hemisphere. |
| Solid name: "my shape" Equation $z=10*\sin(x)+30$ Resolution: 10 Bound choice: circle Radius: 50 Center point: 0, 0 | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII my shape.stl Looks like high waves on a circle. | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII my shape.stl Looks like high waves on a circle, but the waves at the edge on opposite sides are not quite right. |
| Solid name: "thissolidnameiswaytoolongbecauseitsover80bytesandsoit shouldreportanerrorandnotallowittobeassigned" Solid name: "my-solid" Equation $z=40$ Equation $z=-300$ Resolution: 7.1 Resolution: 7 Bound choice: choice Radius: 5 Center point: 0, 0 Solid name: "my-solid" Equation $z=\exp(x)/10$ Resolution: 7 Bound choice: c Radius: 5 Center point: 0, 0 | Invalid solid name, try again Accept solid name Invalid equation, try again Accept equation Invalid resolution, try again Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 3D surface not above XY plane, try again Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII my-solid.stl Looks like a ramp starting at a point and going down to a flat circle. | Invalid solid name, try again Accept solid name Invalid equation, try again Accept equation Invalid resolution, try again Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 3D surface not above XY plane, try again Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII my-solid.stl Looks like a ramp starting at a point and going down to a flat circle. |
| Solid name: "absolute value" Equation $z=\text{abs}(x-y)$ Resolution: 7 Bound choice: c Radius: 100 Center point: 0, 0 | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII absolute value.stl Looks like cylinder with V-shaped chunk cut out of it. | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII absolute value.stl Looks like cylinder with V-shaped chunk cut out of it, but with small bumps in the V. |
| Solid name: "cos over circle" Equation $z=\cos(x+y)$ | Accept solid name Accept equation | Accept solid name Accept equation |

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| Resolution: 7 Bound choice: c Radius: 5 Center point: 0, 0 | Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII cos over circle.stl Looks like one large wave in middle with two starting closer to the sides. | Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII cos over circle.stl Looks like one large wave in middle with two starting closer to the sides. |
| Solid name: "tan over circle" Equation $z=\tan y$ Resolution: 10 Bound choice: circle Radius: 1 Center point: 0, 0 | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII tan over circle.stl Looks like flat half of circle bound with concave up arc over other half. | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII tan over circle.stl Looks like flat half of circle bound with concave up arc over other half. |
| Solid name: "300plusy" Equation $z=300+y$ Resolution: 9 Bound choice: c Radius: 300 Center point: -100,-100 | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII 300plusy.stl Looks like a cylinder with slanted top extending into the bound. | Accept solid name Accept equation Accept resolution Accept bound choice (as c for circle) Accept radius Accept center point 2D display of bound Output of ASCII 300plusy.stl Looks like cylinder with slanted top extending into the bound. |
| Solid name: "a\b.,](c" Solid name: "b/a?>" Solid name: "my-Solid 8" Equation $z=p$ Equation $z=\cos(y+x)$ Resolution: 0 Resolution: 10 Bound choice: r Vertex 1: 1,1 Vertex 2: 2,2 Vertex 3: 1,3 Vertex 4: 1,2 Vertex 1: -2,-2 Vertex 2: 2,2 Vertex 3: -2,2 Vertex 4: 2,-2 | Invalid solid name, try again Invalid solid name, try again Accept solid name Invalid equation, try again Accept equation Invalid resolution, try again Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted Does not form rectangle, try again Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII my-Solid 8.stl Looks like a bird or stingray with flat "wings". | Invalid solid name, try again Invalid solid name, try again Accept solid name Invalid equation, try again Accept equation Invalid resolution, try again Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted Does not form rectangle, try again Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII my-Solid 8.stl Looks like a bird or stingray with flat "wings". |

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| Solid name: "my rectangle" Equation $z = \exp(y)/10$ Resolution: 9 Bound choice: r Vertex 1: 0,0 Vertex 2: 0,5 Vertex 3: 10,0 Vertex 4: 10,5 | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII my rectangle.stl Looks like half of a ramp with pointed line top. | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII my rectangle.stl Looks like half of a ramp with pointed line top. |
| Solid name: "rectangle" Equation $z = x^2$ Resolution: 8 Bound choice: r Vertex 1: -10,-10 Vertex 2: 10,10 Vertex 3: -10,10 Vertex 4: 10,-10 | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII rectangle.stl Looks like a very tall ramp with pointed line top reaching the bound in the middle. | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII rectangle.stl Looks like a very tall ramp with pointed line top reaching the bound in the middle. |
| Solid name: "sine" Equation $z = 10 \cdot \sin x + 30$ Resolution: 8 Bound choice: r Vertex 1: -20,-30 Vertex 2: -20,30 Vertex 3: 20,30 Vertex 4: 20,-30 | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII sine.stl Looks like tall, neat ocean waves. | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII sine.stl Looks like tall ocean waves, but not very neat. |
| Solid name: "tany rectangle" Equation $z = \tanh y$ Resolution: 9 Bound choice: r Vertex 1: -1,1 Vertex 2: 1,1 Vertex 3: -1,-1 Vertex 4: 1,-1 | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII tany rectangle.stl Looks like half a ramp with pointed line top. | Accept solid name Accept equation Accept resolution Accept bound choice (r for rectangle) Vertex accepted Vertex accepted Vertex accepted Vertex accepted 2D display of bound Output of ASCII tany rectangle.stl Looks like half a ramp with pointed line top. |
| Solid name: "" Solid name: "my_solid" Equation $z = \ln x$ | Invalid solid name, try again Accept solid name Accept equation | Invalid solid name, try again Accept solid name Accept equation |

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| Resolution: 15 Resolution: 10 Bound choice: triangle Vertex 1: 300,300 Vertex 2: 100,100 Vertex 3: 200,200 Vertex 1: 1,0 Vertex 2: 1,10 Vertex 3: 20,5 | Invalid resolution, try again Accept resolution Accept bound choice (t for triangle) Accept vertex Accept vertex Accept vertex Does not form triangle, try again Accept vertex Accept vertex Accept vertex 2D display of bound Output of ASCII my_solid.stl Looks like a piece of pie with tapered pie crust edge. | Invalid resolution, try again Accept resolution Accept bound choice (t for triangle) Accept vertex Accept vertex Accept vertex Does not form triangle, try again Accept vertex Accept vertex Accept vertex 2D display of bound Output of ASCII my_solid.stl Looks like a piece of pie with tapered pie crust edge. |
| Solid name: "abs triangle" Equation $z=abs(x-y)$ Resolution: a Resolution: 10 Bound choice: t Vertex 1: -100,-100 Vertex 2: -100,100 Vertex 3: 0,100 | Accept solid name Accept equation Invalid resolution, try again Accept resolution Accept bound choice (t for triangle) Accept vertex Accept vertex Accept vertex 2D display of bound Output of ASCII abs triangle.stl Looks like a 3D right triangle with a flat chunk out of the side. | Accept solid name Accept equation Invalid resolution, try again Accept resolution Accept bound choice (t for triangle) Accept vertex Accept vertex Accept vertex 2D display of bound Output of ASCII abs triangle.stl Looks like a 3D right triangle with a flat chunk out of the side. |
| Solid name: "xsquared" Equation $z=x^2$ Resolution: 10 Bound choice: triangle Vertex 1: -5,5 Vertex 2: -5,-5 Vertex 3: 5,0 | Accept solid name Accept equation Accept resolution Accept bound choice (t for triangle) Accept vertex Accept vertex Accept vertex 2D display of bound Output of ASCII xsquared.stl Looks like very steep ramp going down to the bound in the middle, one peak sharp, other flat. | Accept solid name Accept equation Accept resolution Accept bound choice (t for triangle) Accept vertex Accept vertex Accept vertex 2D display of bound Output of ASCII xsquared.stl Looks like very steep ramp going down to the bound in the middle, one peak sharp, other flat. |