



Archive



sketchsolve

A geometric constraints solver for use in CAD software

SketchSolve can be used to solve solve geometric constraints problems found in CAD software. This project is one of the first geometric constraints solver intended to be used in open source CAD software. Another similar project here on Google code is psketcher. In these problems profiles can be created from primitive objects like points, lines, circles, and arcs. These primitives are subjected to geometric constraints like equal length, concentric arcs and so forth. The solver then solves for a set of primitive parameters that satisfy the sketch constraints.

Currently only 2d sketch problems are supported. However I hope to soon also have a set of 3D part Assembly constraints working. This would make SketchSolve be able to solve complex Assemblies. However, I only plan to write that section of the code if people actually use the 2d solver.

The solution method used is actually a optimization method. The sum of the constraint violations are the objective of the optimization problem. The optimization routine used is a BFGS update Newtons method. An Optimization routine was selected because there are often more or fewer constraint equations than unknowns.

The constraints that are currently supported are the following:

1. pointOnPoint
2. pointToLine
3. pointOnCurve
4. horizontal
5. vertical
6. radiusValue
7. tangentToArc
8. tangentToCircle
9. arcRules
10. Point to point Distance
11. Point to point vertical Distance

12. Point to point horizontal Distance
13. Point to line Distance
14. Point to line vertical Distance
15. Point to line horizontal Distance
16. lineLength
17. equalLegnth
18. arcRadius
19. equalRadiusArcs
20. equalRadiusCircles
21. equalRadiusCircArc
22. concentricArcs
23. concentricCircles
24. concentricCircArc
25. circleRadius
26. angle (between two lines)
27. parallel
28. Perpendicular
29. Colinear Lines
30. Point On Circle
31. Point On Arc
32. Point On midpoint of a line
33. Point on midpoint of an arc
34. Point on a quadrant point of a circle
 - +x (parameter = 0)
 - +y (parameter = 1)
 - -x (parameter = 2)
 - -y (parameter = 3)
35. Points Symmetric about a line
36. lines Symmetric about a line
37. Circles Symmetric about a line
38. Arcs Symmetric about a line

The constraints that will be implemented soon are the following:

1. others I can't think of right now

Let me know if there are constraints that you use that are not on these lists !!!!

Thanks!

Project Information

- License: New BSD License

- 24 stars
- svn-based source control

Labels:

