

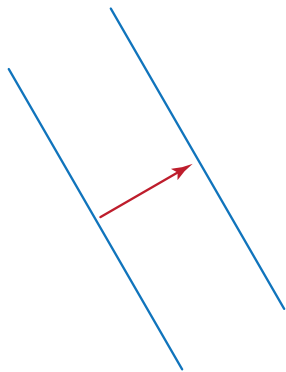
Sweeping Shapes

Joseph O'Rourke

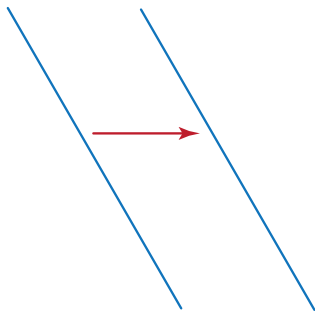
January 25, 2010

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- 2 Square
- 3 Disk
- 4 Equilateral Triangle
- 5 Dumitrescu-Jiang Paper

Sweeping Models

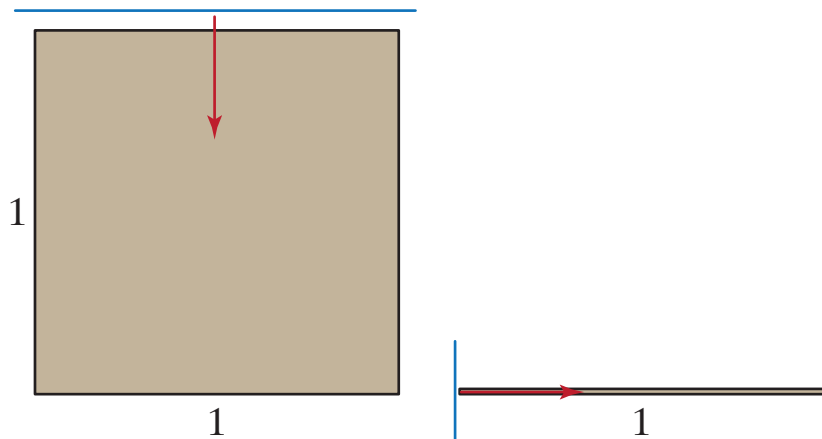


Orthogonal Sweeping



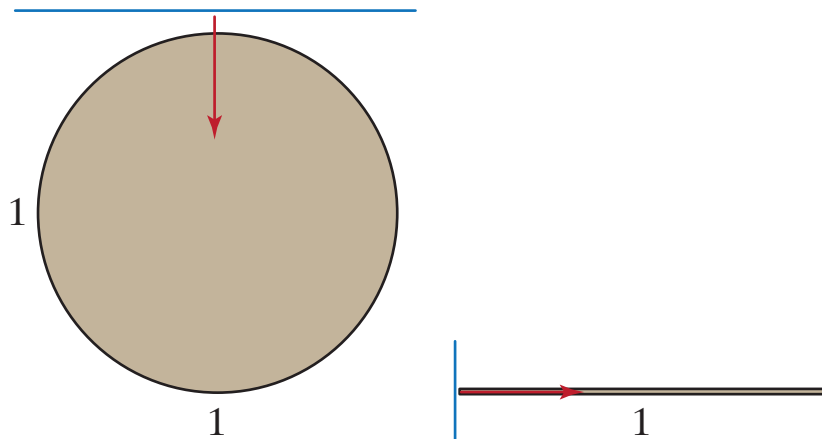
Slanted Sweeping

Unit Square



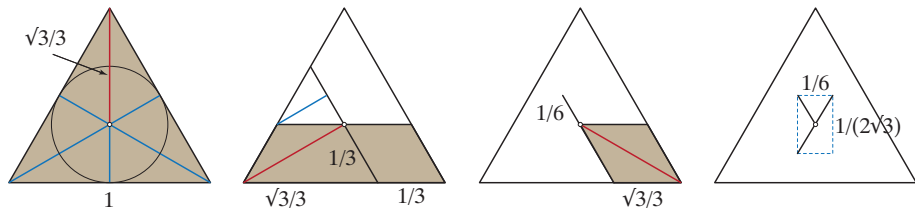
$$1 + 1 = 2$$

Unit Disk



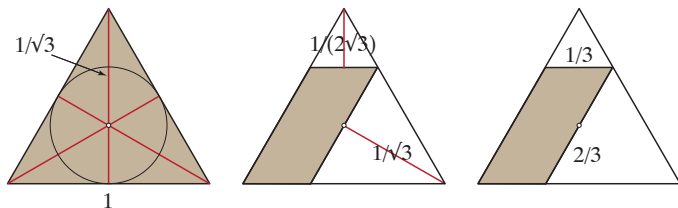
$$1 + 1 = 2$$

Unit Equilateral Triangle: Y-Sweep



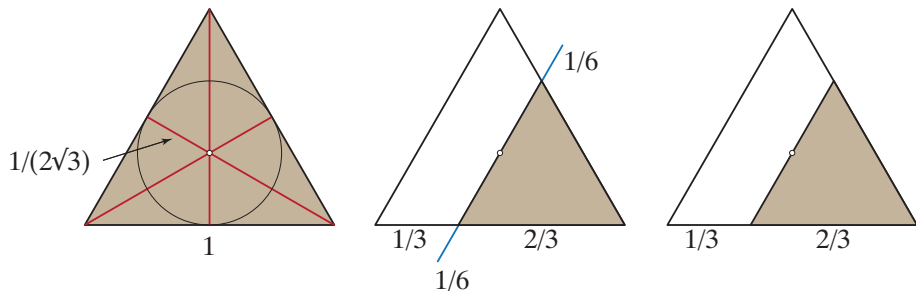
$$\sqrt{3} + 1/6 + 1/(2\sqrt{3}) \approx 2.18$$

Unit Equilateral Triangle: Parallelogram



$$1/(2\sqrt{3}) + 1/\sqrt{3} + (1/3 + 2/3) = 1 + \sqrt{3}/2$$

Unit Equilateral Triangle: Recursive



$$s(x) = 1/(2\sqrt{3}) + 1/3 + s((2/3)x)$$

$$s(x) = [(2+\sqrt{3})/6] [1 + (2/3) + (2/3)^2 + \dots]$$

$$s(x) = [(2+\sqrt{3})/6] [1/(1 - (2/3))]$$

$$s(x) = [(2+\sqrt{3})/6] [3]$$

Dumitrescu-Jiang Paper

“Sweeping Points.” Adrian Dumitrescu and Minghui Jiang. *Algorithmica*, 2010, to appear.

- Several models, many results

Dumitrescu-Jiang Paper

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- Several models, many results
- Focus on discrete points

Dumitrescu-Jiang Paper

“Sweeping Points.” Adrian Dumitrescu and Minghui Jiang. *Algorithmica*, 2010, to appear.

- Several models, many results
- Focus on discrete points
- Orthogonal sweeps only
- Lower & Upper Bounds: between $\sqrt{3}$ and 2