



MATH BITES

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TYING THINGS TOGETHER



We all know that elegance is highly prized in mathematics, even if we are not always agreed on what it constitutes.

Not sure whether or not to tie that tie with something a bit different? Thanks to mathematical logic and topology there are now over 177 000 options.

Early in 2013 Mikael Vejdemo-Johansson of the KTH Royal Institute of Technology in Stockholm, inspired by the film *The Matrix*, built on work in 1999 by Thomas Fink and Yong Mao of Cambridge University, to extend the range of sartorial possibilities.

Fans could try the Merovingian knot (see image above), <http://thewelldressedman.net/how-to-tie-a-merovingian-knot> or have a go at the knots pictured right, www.ties.com.



CELTIC JEWELLERY AND THE TREFOIL KNOT



The trefoil knot is the simplest nontrivial knot, that is, it is not possible to ‘undo’ it in three dimensions without cutting it. It can be represented parametrically by the relations:

$$x = \sin(t) + 2\sin(2t), y = \cos(t) - 2\cos(2t) \text{ and } z = -3\sin(t)$$

It’s also a simple ‘doodle’ to draw. The name comes from the trefoil (Latin trifolium) or three-leaf family of plants such as clover. Trefoils occur in design, art and architecture, and are used as a triquetra or symbolic representation. It is a popular design for modern Celtic style jewellery such as pendants.

REFERENCES AND FURTHER READING

Tying things together

www.newscientist.com/article/dn25019-matrix-villain-spawns-177000-ways-to-knot-a-tie.html
www.ties.com/how-to-tie-a-tie

Celtic jewellery and the trefoil knot

http://en.wikipedia.org/wiki/Trefoil_knot
<http://demonstrations.wolfram.com/TheShortestDistanceToATrefoilKnot/>
<http://bellaluna67.deviantart.com/art/triquetra-trinity-necklace-137764016>