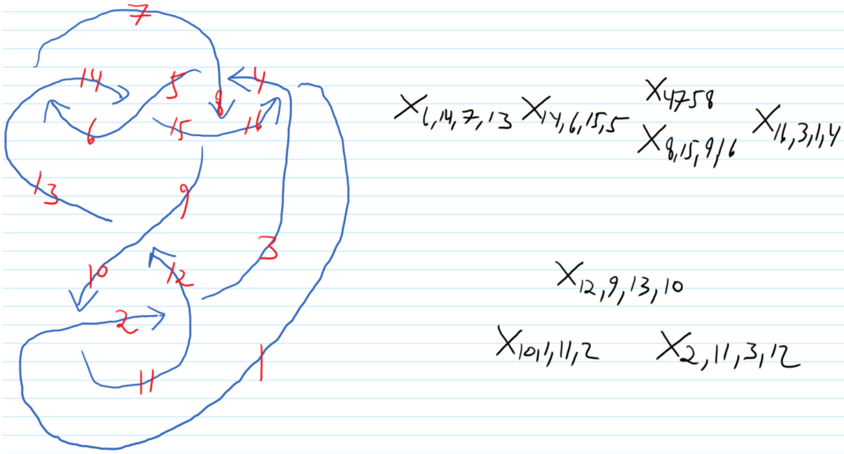
Pensieve header: Analyzing a knot suggested by David Vincent.




```
<< KnotTheory`
```

```
Loading KnotTheory` version of September 6, 2014, 13:37:37.2841.
Read more at http://katlas.org/wiki/KnotTheory.
```

```
K = PD[X[6, 14, 7, 13], X[14, 6, 15, 5], X[4, 7, 5, 8], X[8, 15, 9, 16],
   X[16, 3, 1, 4], X[12, 9, 13, 10], X[10, 1, 11, 2], X[2, 11, 3, 12]];
```

```
? Jones
```

Jones[L][q] computes the Jones polynomial of a knot or link L as a function of the variable q.

```
J = Jones[K][q]
```

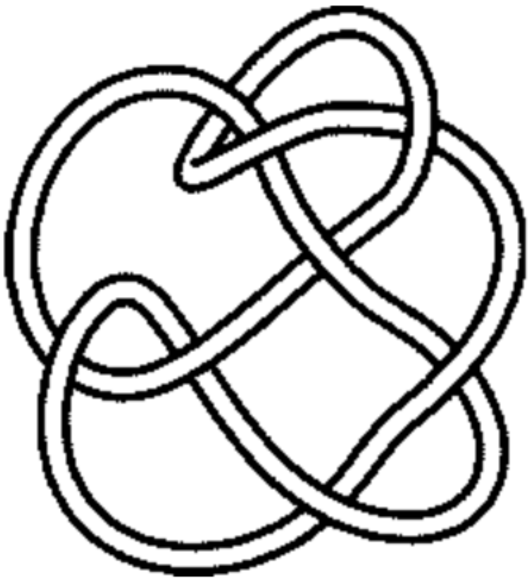
$$-2+\frac{1}{q^7}-\frac{3}{q^6}+\frac{4}{q^5}-\frac{5}{q^4}+\frac{6}{q^3}-\frac{5}{q^2}+\frac{4}{q}+q$$

```
{K1} = Select[AllKnots[{3, 8}], Jones[#][q] == J &]
```

KnotTheory: Loading precomputed data in Jones4Knots`.

{Knot[8, 14]}

From http://katlas.org/wiki/8_ 14:



(KnotPlot image)

```
Jones[K1][q]
```

$$-2+\frac{1}{q^7}-\frac{3}{q^6}+\frac{4}{q^5}-\frac{5}{q^4}+\frac{6}{q^3}-\frac{5}{q^2}+\frac{4}{q}+q$$

```
? Alexander
```

Alexander[K][t] computes the Alexander polynomial of a knot K as a function of the variable t. Alexander[K, r][t] computes a basis of the r'th Alexander ideal of K in Z[t].

```
{Alexander[K][t], Alexander[K1][t]}
```

KnotTheory: Loading precomputed data in PD4Knots`.

$$\left\{-11-\frac{2}{t^2}+\frac{8}{t}+8\,t-2\,t^2,\ -11-\frac{2}{t^2}+\frac{8}{t}+8\,t-2\,t^2\right\}$$

```
? HOMFLYPT
```

HOMFLYPT[K][a, z] computes the HOMFLY-PT (Hoste, Ocneanu, Millett, Freyd, Lickorish, Yetter, Przytycki and Traczyk) polynomial of a knot/link K, in the variables a and z.

```
{HOMFLYPT[K][a, q], HOMFLYPT[K1][a, q]}
```

KnotTheory: The HOMFLYPT program was written by Scott Morrison.

$$\left\{1+q^2-a^2 q^2-a^4 q^2+a^6 q^2-a^2 q^4-a^4 q^4,\ 1+q^2-a^2 q^2-a^4 q^2+a^6 q^2-a^2 q^4-a^4 q^4\right\}$$

```
? Kh
```

Kh[L][q, t] returns the Poincare polynomial of the
Khovanov Homology of a knot/link L (over a field of characteristic 0)
in terms of the variables q and t. Kh[L, Program -> prog] uses the
program prog to perform the computation. The currently available
programs are "FastKh", written in Mathematica by Dror Bar-Natan in
the winter of 2005, "JavaKh-v1", written in java (java 1.5
required!) by Jeremy Green in the summer of 2005 and "JavaKh-v2"
(default), an update of "JavaKh-v1" (now requiring java 1.6) written by Scott Morrison in 2008.
("JavaKh" is also available, currently an alias for "JavaKh-v2".)
The java programs are several thousand times faster than the Mathematica program, though java
may not be available on some systems. "JavaKh2" also takes the option
"Modulus -> p" which changes the characteristic of the ground field
to p. If p==0 JavaKh works over the rational numbers; if p==Null JavaKh
works over Z (see ?ZMod for the output format).

```
{Kh[K][q, t], Kh[K1][q, t]} // Column
```

KnotTheory: The Khovanov homology program JavaKh-v2 is an update of Jeremy Green's program JavaKh-v1, written by Scott Morrison in 2008 at Microsoft Station Q.

KnotTheory: Loading precomputed data in Kh4Knots`.

$$\frac{2}{q^3}+\frac{3}{q}+\frac{1}{q^{15}t^6}+\frac{2}{q^{13}t^5}+\frac{1}{q^{11}t^5}+\frac{2}{q^{11}t^4}+\frac{2}{q^9t^4}+\frac{3}{q^9t^3}+\frac{2}{q^7t^3}+\frac{3}{q^7t^2}+\frac{3}{q^5t^2}+\frac{2}{q^5t}+\frac{3}{q^3t}+\frac{t}{q}+q\,t+q^3t^2$$

$$\frac{2}{q^3}+\frac{3}{q}+\frac{1}{q^{15}t^6}+\frac{2}{q^{13}t^5}+\frac{1}{q^{11}t^5}+\frac{2}{q^{11}t^4}+\frac{2}{q^9t^4}+\frac{3}{q^9t^3}+\frac{2}{q^7t^3}+\frac{3}{q^7t^2}+\frac{3}{q^5t^2}+\frac{2}{q^5t}+\frac{3}{q^3t}+\frac{t}{q}+q\,t+q^3t^2$$