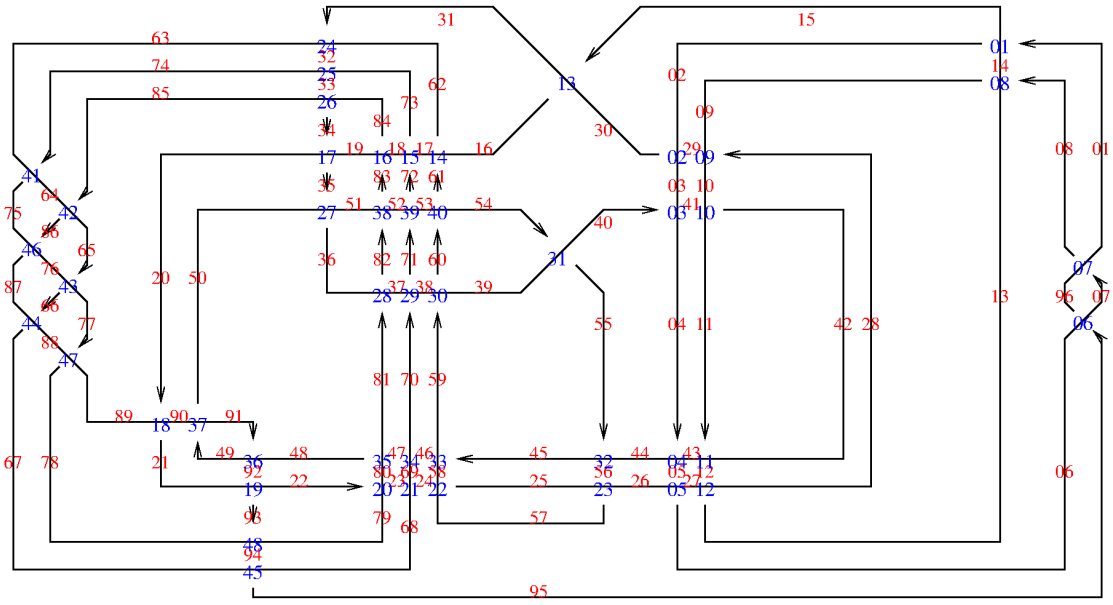
Pensieve header: The GST-48 knot.

```
SetDirectory["C:\\drorbn\\AcademicPensieve\\2016-09"];
<< OneSmidgen.m
```

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

```
Import["GST48-Marked.png"]
```



```
PD[GST48] = PD[
   X[01, 15, 02, 14], X[29, 02, 30, 03],
   X[40, 04, 41, 03], X[04, 44, 05, 43], X[05, 26, 06, 27],
   X[95, 07, 96, 06], X[07, 01, 08, 96], X[08, 14, 09, 13],
   X[28, 09, 29, 10], X[41, 11, 42, 10],
   X[11, 43, 12, 42], X[12, 27, 13, 28], X[15, 31, 16, 30],
   X[61, 16, 62, 17], X[72, 17, 73, 18],
   X[83, 18, 84, 19], X[34, 20, 35, 19], X[20, 89, 21, 90],
   X[92, 21, 93, 22], X[22, 79, 23, 80],
   X[23, 68, 24, 69], X[24, 57, 25, 58], X[56, 25, 57, 26],
   X[31, 63, 32, 62], X[32, 74, 33, 73],
   X[33, 85, 34, 84], X[35, 50, 36, 51], X[81, 37, 82, 36],
   X[70, 38, 71, 37], X[59, 39, 60, 38],
   X[54, 39, 55, 40], X[55, 45, 56, 44], X[45, 59, 46, 58],
   X[46, 70, 47, 69], X[47, 81, 48, 80],
   X[91, 49, 92, 48], X[49, 91, 50, 90], X[82, 52, 83, 51],
   X[71, 53, 72, 52], X[60, 54, 61, 53],
   X[74, 63, 75, 64], X[85, 64, 86, 65], X[65, 76, 66, 77],
   X[66, 87, 67, 88], X[94, 67, 95, 68],
   X[86, 75, 87, 76], X[77, 88, 78, 89], X[93, 78, 94, 79] ];
```

```
Alexander[GST48][t] // Factor
```

$$-\frac{1}{t^8}\left(-1+2\,t-t^2-t^3+2\,t^4-t^5+t^8\right)\left(-1+t^3-2\,t^4+t^5+t^6-2\,t^7+t^8\right)$$

```
KnotSignature[GST48]
```

```
0
```

```
With[{f = -1 + 2 t - t^2 - t^3 + 2 t^4 - t^5 + t^8}, Simplify[Alexander[GST48][t] == f (f /. t → 1/t)]]
```

```
True
```

```
Dynamic[{Length[Z$todo], Z$x, Z$todo}]
```

```
{0, Z$x, Z$todo}
```

```
t_ = t; Z[GST48]
```

$$\mathbb{E}\Big[13-\frac{1}{t^8}+\frac{2}{t^7}-\frac{1}{t^6}-\frac{2}{t^4}+\frac{5}{t^3}-\frac{2}{t^2}-\frac{7}{t}-7\,t-2\,t^2+5\,t^3-2\,t^4-t^6+2\,t^7-t^8,\,0,\,0,$$
$$224\,956+8628\,c+\frac{13}{t^{32}}-\frac{16\,c}{t^{32}}-\frac{110}{t^{31}}+\frac{120\,c}{t^{31}}+\frac{426}{t^{30}}-\frac{385\,c}{t^{30}}-\frac{1006}{t^{29}}+\frac{676\,c}{t^{29}}+\frac{1690}{t^{28}}-\frac{784\,c}{t^{28}}-\frac{2449}{t^{27}}+$$
$$\frac{1198\,c}{t^{27}}+\frac{3698}{t^{26}}-\frac{5793\,c}{2\,t^{26}}-\frac{5392}{t^{25}}+\frac{9569\,c}{2\,t^{25}}+\frac{5807}{t^{24}}-\frac{2918\,c}{t^{24}}-\frac{3039}{t^{23}}-\frac{3274\,c}{t^{23}}-\frac{1952}{t^{22}}+\frac{11\,923\,c}{2\,t^{22}}+$$
$$\frac{7062}{t^{21}}-\frac{646\,c}{t^{21}}-\frac{13\,976}{t^{20}}+\frac{5229\,c}{2\,t^{20}}+\frac{24\,036}{t^{19}}-\frac{29\,531\,c}{t^{19}}-\frac{27\,865}{t^{18}}+\frac{58\,335\,c}{t^{18}}+\frac{14\,568}{t^{17}}-\frac{36\,499\,c}{t^{17}}+$$
$$\frac{1523}{t^{16}}-\frac{31\,212\,c}{t^{16}}+\frac{9189}{t^{15}}+\frac{55\,648\,c}{t^{15}}-\frac{32\,806}{t^{14}}+\frac{9749\,c}{2\,t^{14}}+\frac{6572}{t^{13}}-\frac{67\,387\,c}{2\,t^{13}}+\frac{70\,356}{t^{12}}-\frac{91\,406\,c}{t^{12}}-$$
$$\frac{71\,698}{t^{11}}+\frac{500\,701\,c}{2\,t^{11}}-\frac{87\,333}{t^{10}}-\frac{361\,145\,c}{2\,t^{10}}+\frac{229\,431}{t^9}-\frac{115\,093\,c}{t^9}-\frac{53\,565}{t^8}+\frac{575\,659\,c}{2\,t^8}-\frac{413\,089}{t^7}-$$
$$\frac{255\,051\,c}{2\,t^7}+\frac{688\,179}{t^6}-\frac{190\,615\,c}{2\,t^6}-\frac{367\,037}{t^5}+\frac{60\,617\,c}{2\,t^5}-\frac{313\,161}{t^4}+\frac{394\,233\,c}{2\,t^4}+\frac{687\,947}{t^3}-\frac{191\,058\,c}{t^3}-$$
$$\frac{442\,972}{t^2}-\frac{58\,548\,c}{t^2}-\frac{49\,189}{t}+\frac{162\,150\,c}{t}+38\,417\,t-\frac{219\,015\,c\,t}{2}-389\,878\,t^2-\frac{149\,991\,c\,t^2}{2}+$$
$$442\,865\,t^3+253\,710\,c\,t^3-111\,675\,t^4-126\,942\,c\,t^4-381\,647\,t^5-97\,032\,c\,t^5+691\,047\,t^6+$$
$$51\,156\,c\,t^6-589\,895\,t^7+\frac{344\,873\,c\,t^7}{2}+162\,331\,t^8-\frac{341\,955\,c\,t^8}{2}+248\,205\,t^9-\frac{233\,899\,c\,t^9}{2}-$$
$$356\,293\,t^{10}+\frac{636\,481\,c\,t^{10}}{2}+194\,810\,t^{11}-\frac{389\,149\,c\,t^{11}}{2}-16\,686\,t^{12}-46\,825\,c\,t^{12}-15\,840\,t^{13}+$$
$$\frac{221\,599\,c\,t^{13}}{2}-37\,762\,t^{14}-\frac{22\,403\,c\,t^{14}}{2}+49\,359\,t^{15}-44\,534\,c\,t^{15}+2371\,t^{16}-\frac{24\,259\,c\,t^{16}}{2}-$$
$$46\,496\,t^{17}+\frac{141\,789\,c\,t^{17}}{2}+39\,311\,t^{18}-51\,698\,c\,t^{18}-7048\,t^{19}-976\,c\,t^{19}-9696\,t^{20}+20\,285\,c\,t^{20}+$$
$$5130\,t^{21}-6909\,c\,t^{21}+2778\,t^{22}-3177\,c\,t^{22}-3453\,t^{23}-\frac{2503\,c\,t^{23}}{2}+467\,t^{24}+6626\,c\,t^{24}+708\,t^{25}-$$
$$\frac{9737\,c\,t^{25}}{2}+110\,t^{26}+728\,c\,t^{26}-775\,t^{27}+748\,c\,t^{27}+598\,t^{28}-\frac{447\,c\,t^{28}}{2}-194\,t^{29}-\frac{241\,c\,t^{29}}{2}+$$
$$6\,t^{30}-56\,c\,t^{30}+14\,t^{31}+184\,c\,t^{31}-3\,t^{32}-120\,c\,t^{32}+35\,c\,t^{33}-4\,c\,t^{34}-\frac{138\,459\,u\,w}{2}+\frac{16\,u\,w}{t^{32}}-$$
$$\frac{104\,u\,w}{t^{31}}+\frac{281\,u\,w}{t^{30}}-\frac{395\,u\,w}{t^{29}}+\frac{389\,u\,w}{t^{28}}-\frac{809\,u\,w}{t^{27}}+\frac{4175\,u\,w}{2\,t^{26}}-\frac{2697\,u\,w}{t^{25}}+\frac{221\,u\,w}{t^{24}}+\frac{3495\,u\,w}{t^{23}}-$$
$$\frac{4933\,u\,w}{2\,t^{22}}-\frac{3641\,u\,w}{2\,t^{21}}-\frac{4435\,u\,w}{t^{20}}+\frac{25\,096\,u\,w}{t^{19}}-\frac{33\,239\,u\,w}{t^{18}}+\frac{3260\,u\,w}{t^{17}}+\frac{34\,472\,u\,w}{t^{16}}-\frac{21\,176\,u\,w}{t^{15}}-$$
$$\frac{52\,101\,u\,w}{2\,t^{14}}+\frac{7643\,u\,w}{t^{13}}+\frac{99\,049\,u\,w}{t^{12}}-\frac{302\,603\,u\,w}{2\,t^{11}}+\frac{29\,271\,u\,w}{t^{10}}+\frac{144\,364\,u\,w}{t^9}-\frac{286\,931\,u\,w}{2\,t^8}-$$
$$\frac{15\,940\,u\,w}{t^7}+\frac{158\,735\,u\,w}{2\,t^6}+\frac{49\,059\,u\,w}{t^5}-\frac{296\,115\,u\,w}{2\,t^4}+\frac{86\,001\,u\,w}{2\,t^3}+\frac{203\,097\,u\,w}{2\,t^2}-\frac{121\,203\,u\,w}{2\,t}+$$
$$40\,278\,t\,u\,w+\frac{230\,547}{2}\,t^2\,u\,w-\frac{276\,873}{2}\,t^3\,u\,w-\frac{22\,989}{2}\,t^4\,u\,w+\frac{171\,075}{2}\,t^5\,u\,w+\frac{68\,763}{2}\,t^6\,u\,w-$$
$$138\,055\,t^7\,u\,w+\frac{65\,845}{2}\,t^8\,u\,w+149\,872\,t^9\,u\,w-\frac{336\,737}{2}\,t^{10}\,u\,w+26\,206\,t^{11}\,u\,w+73\,031\,t^{12}\,u\,w-$$
$$\frac{75\,537}{2}\,t^{13}\,u\,w-26\,567\,t^{14}\,u\,w+17\,967\,t^{15}\,u\,w+\frac{60\,193}{2}\,t^{16}\,u\,w-40\,798\,t^{17}\,u\,w+10\,900\,t^{18}\,u\,w+$$
$$11\,876\,t^{19}\,u\,w-8409\,t^{20}\,u\,w-1500\,t^{21}\,u\,w+1677\,t^{22}\,u\,w+\frac{5857}{2}\,t^{23}\,u\,w-\frac{7395}{2}\,t^{24}\,u\,w+1171\,t^{25}\,u\,w+$$
$$443\,t^{26}\,u\,w-305\,t^{27}\,u\,w-\frac{163}{2}\,t^{28}\,u\,w+39\,t^{29}\,u\,w+95\,t^{30}\,u\,w-89\,t^{31}\,u\,w+31\,t^{32}\,u\,w-4\,t^{33}\,u\,w\Big]$$

```
TimeUsed[]
```

```
16149.
```

```
z[K_] := Z[K];
za[K_] := z[K][[1]];
zp1[K_] := Factor[z[K][[4]] /. c | u | w → 0 / ((t - 1) za[K]^2)];
zp2[K_] := Factor[Coefficient[z[K][[4]], c] / ((t^2 - 1) (-4 - t + t^2) za[K]^3)];
With[{K = GST48}, {Factor@za[K], zp1[K], zp2[K]}]
```

$$\left\{-\frac{1}{t^8}\left(-1+2t-t^2-t^3+2t^4-t^5+t^8\right)\left(-1+t^3-2t^4+t^5+t^6-2t^7+t^8\right),\right.$$
$$-\frac{1}{t^{16}}\left(13-45t+71t^2-71t^3+58t^4-35t^5-39t^6+101t^7+37t^8-335t^9+372t^{10}+56t^{11}-\right.$$
$$\left.506t^{12}+478t^{13}-114t^{14}-81t^{15}-31t^{16}+204t^{17}-270t^{18}+210t^{19}+8t^{20}-328t^{21}+\right.$$
$$\left.481t^{22}-311t^{23}-7t^{24}+169t^{25}-115t^{26}-10t^{27}+59t^{28}-31t^{29}+t^{30}+3t^{31}\right),$$
$$\frac{1}{2t^8}\left(8-14t+14t^2-14t^3+22t^4-29t^5+26t^6-22t^7+26t^8-29t^9+\right.$$
$$\left.\left.22t^{10}-14t^{11}+14t^{12}-14t^{13}+8t^{14}\right)\right\}$$

```
With[{K = GST48}, {Vassiliev[2][K], Vassiliev[3][K]}]
```

$$\{-4, -19\}$$