

```
<< KnotTheory`
```

```
Loading KnotTheory` version of August 31, 2006, 11:25:27.5625.
```

```
Read more at http://katlas.math.toronto.edu/wiki/KnotTheory.
```

```
T = X[6, 4, 1, 3] X[4, 2, 5, 1] X[2, 6, 3, 5]
```

```
X[2, 6, 3, 5] X[4, 2, 5, 1] X[6, 4, 1, 3]
```

```
SetAttributes[p, Orderless]
```

```
o1 = T /. X[a_, b_, c_, d_] => B * p[a, d] p[b, c] + A * p[a, b] p[c, d]
```

```
(A p[1, 5] p[2, 4] + B p[1, 4] p[2, 5])
```

```
(A p[2, 6] p[3, 5] + B p[2, 5] p[3, 6]) (B p[1, 4] p[3, 6] + A p[1, 3] p[4, 6])
```

```
o2 = Expand[o1]
```

```
A2 B p[1, 4] p[1, 5] p[2, 4] p[2, 6] p[3, 5] p[3, 6] +
```

```
A B2 p[1, 4]2 p[2, 5] p[2, 6] p[3, 5] p[3, 6] + A B2 p[1, 4] p[1, 5] p[2, 4] p[2, 5] p[3, 6]2 +
```

```
B3 p[1, 4]2 p[2, 5]2 p[3, 6]2 + A3 p[1, 3] p[1, 5] p[2, 4] p[2, 6] p[3, 5] p[4, 6] +
```

```
A2 B p[1, 3] p[1, 4] p[2, 5] p[2, 6] p[3, 5] p[4, 6] +
```

```
A2 B p[1, 3] p[1, 5] p[2, 4] p[2, 5] p[3, 6] p[4, 6] +
```

```
A B2 p[1, 3] p[1, 4] p[2, 5]2 p[3, 6] p[4, 6]
```

```
o3 = o2 //. p[a_, b_] p[b_, c_] => p[a, c]
```

```
B3 p[1, 4]2 p[2, 5]2 p[3, 6]2 + A B2 p[3, 6]2 p[4, 5]2 +
```

```
A B2 p[2, 5]2 p[4, 6]2 + A3 p[3, 5]2 p[4, 6]2 + 3 A2 B p[5, 6]2 + A B2 p[1, 4]2 p[5, 6]2
```

```
o4 = o3 /. p[_ , _]^2 -> d
```

```
3 A2 B d + A3 d2 + 3 A B2 d2 + B3 d3
```

```
o5 = Expand[o4 /. {B -> 1/A, d -> -A^2 - 1/A^2}]
```

```
 $-\frac{1}{A^9} + \frac{1}{A} + A^3 + A^7$ 
```

```
PD[Knot[3, 1]]
```

```
KnotTheory::loading: Loading precomputed data in PD4Knots`.
```

```
PD[X[1, 4, 2, 5], X[3, 6, 4, 1], X[5, 2, 6, 3]]
```

```
Jones[%] [q]
```

```
 $-\frac{1}{q^4} + \frac{1}{q^3} + \frac{1}{q}$ 
```

```
l = Jones[#] [q] & /@ AllKnots[];
```

```
KnotTheory::loading: Loading precomputed data in Jones4Knots`.
```

```
KnotTheory::loading: Loading precomputed data in Jones4Knots11`.
```

Length[1]

802

Length[Union[1]]

732

PD[Knot["K16n230212"]]

KnotTheory::loading: Loading precomputed data in KnotTheory/16N.dts.

KnotTheory::credits: The GaussCode to PD conversion was ... ty of Toronto in the summer of 2005.

```

PD[X[4, 2, 5, 1], X[10, 4, 11, 3], X[14, 5, 15, 6], X[7, 16, 8, 17],
  X[2, 10, 3, 9], X[32, 11, 1, 12], X[28, 14, 29, 13], X[20, 15, 21, 16],
  X[17, 24, 18, 25], X[6, 20, 7, 19], X[21, 9, 22, 8], X[30, 24, 31, 23],
  X[25, 18, 26, 19], X[12, 28, 13, 27], X[26, 30, 27, 29], X[22, 32, 23, 31]]

```

Jones[%][q]

$$-25 + \frac{1}{q^3} - \frac{5}{q^2} + \frac{13}{q} + 39q - 49q^2 + 55q^3 - 52q^4 + 44q^5 - 32q^6 + 18q^7 - 8q^8 + 2q^9$$

l1 = HOMFLYPT[#][a, q] & /@ AllKnots[];

KnotTheory::credits: The HOMFLYPT program was written by Scott Morrison.

KnotTheory::loading: Loading precomputed data in DTCODE4KNOTS_TO11`.

Length[Union[l1]]

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