Other polynomial invariants

There are many polynomial invariants for oriented links (and unoriented knots) other than the Kauffman polynomial $F_L(t)$. Computation of these polynomials are typically based on their *skein relations*:

Kauffman polynomial

(i) $F_U(t) = 1$

(ii) $t^4 F_{L_+}(t) - t^{-4} F_{L_-}(t) + (t^2 - t^{-2}) F_{L_s}(t) = 0$

Jones polynomial

(i) $V_U(s) = 1$

(ii) $s^{-1} V_{L_+}(s) - s V_{L_-}(s) + (s^{-1/2} - s^{1/2}) V_{L_s}(s) = 0$

Alexander polynomial

(i) $\Delta_U(w) = 1$

(ii) $\Delta_{L_+}(w) - \Delta_{L_-}(w) + (w^{1/2} - w^{-1/2}) \Delta_{L_s}(w) = 0$

Conway polynomial

(i) $\nabla_U(z) = 1$

(ii) $\nabla_{L_+}(z) - \nabla_{L_-}(z) + z \nabla_{L_s}(z) = 0$

HOMFLY polynomial

(i) $P_U(x, y) = 1$

(ii) $x P_{L_+}(x, y) + x^{-1} P_{L_-}(x, y) + y P_{L_s}(x, y) = 0$