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Θ[K_] := Module[ {Cs, ϕ, n, A, Δ, G, ev, Θ},
  {Cs, ϕ} = Rot[K]; n = Length[Cs];
  A = IdentityMatrix[2 n + 1];
  Cases[Cs, {s_, i_, j_} >=
    (A[[{i, j}, {i + 1, j + 1}]] += (
      -T^s T^s - 1
      0 -1
    ))];
  Δ = T^(-Total[ϕ] - Total[Cs[[All, 1]])/2 Det[A];
  G = Inverse[A];
  ev[ε_] :=
    Factor[ε /. g_{ν_, α_, β_} >= (G[[α, β]] /. T >= T_ν)];
  Θ = ev[Sum_{k=1}^n F_1[Cs[[k]]]];
  Θ += ev[Sum_{k1=1}^n Sum_{k2=1}^n F_2[Cs[[k1]], Cs[[k2]]]];
  Θ += ev[Sum_{k=1}^{2^n} F_3[ϕ[[k]], k]];
  Factor@
    {Δ, (Δ /. T >= T_1) (Δ /. T >= T_2) (Δ /. T >= T_3) Θ}];

```