

```

sign[ $\mathcal{E}$ ] := Module[{n, d, v, p, rs, e, k},
  {n, d} = NumeratorDenominator[ $\mathcal{E}$ ];
  {n, d} /=  $\omega^{\text{Exponent}[n, \omega]/2}$ ;
  p = Factor[ $\omega^2[v]@n * \omega^2[v]@d /. v \rightarrow 4u^2 - 2$ ];
  rs = Solve[p == 0, u, Reals];
  If[rs === {}, Return[Sign[p /. u → 0]]];
  rs = Union@({u /. rs});
  Sign[(-1)e=Exponent[p, u] Coefficient[p, u, e]] + Sum[
    k = 0;
    While[(d = RootReduce[ $\partial_{\{u, ++k\}} p /. u \rightarrow r$ ]) == 0];
    If[EvenQ[k], 0, 2 Sign[d]] *  $\theta[u - r]$ ,
    {r, rs}] ]

```