Rules for integrands of the form $\left(a + b\,x + c\,x^2\right)^p$

C. Program code

```
Int[(a_.+b_.*x_+c_.*x_^2)^p_.,x_Symbol] :=
  Int1211[a,b,c,p,x] /;
FreeQ[{a,b,c,p},x]
```

```
Int1211[a_,b_,c_,p_,x_] :=
  If[EqQ[p,0],
    (a+b*x+c*x^2)^p*x,
  If[EqQ[c,0],
    Int1111[a,b,1,p,x],
  If[EqQ[b,0],
    Int[(a+c*x^2)^p,x],
  If[EqQ[b^2-4*a*c,0],
    If[IntegerQ[p],
      Int[Cancel[(b/2+c*x)^(2*p)/c^p],x],
    If[LtQ[p,-1],
      2*(a+b*x+c*x^2)^(p+1)/((2*p+1)*(b+2*c*x)),
    If[EqQ[p,-1/2],
      (b/2+c*x)/Sqrt[a+b*x+c*x^2] * Int1111[b/2,c,1,-1,x],
    (b+2*c*x)*(a+b*x+c*x^2)^p/(2*c*(2*p+1))]]],
  If[IntegerQ[p],
    If[EqQ[p,1],
      a*x+b*x^2/2+c*x^3/3,
    If[NeQ[a,0] && PerfectSquareQ[b^2-4*a*c],
      With[{q=Rt[b^2-4*a*c,2]}, 1/c^p * Int[Simp[b/2-q/2+c*x,x]^p*Simp[b/2+q/2+c*x,x]^p,x]],
    If[GtQ[p,0],
      Int[ExpandIntegrand[(a+b*x+c*x^2)^p,x],x],
    If[LtQ[p,-1],
      (b+2*c*x)*(a+b*x+c*x^2)^(p+1)/((p+1)*(b^2-4*a*c)) - 2*c*(2*p+3)/((p+1)*(b^2-4*a*c)) * Int1211[a,b,c,p+1,x],
    If[EqQ[a,0],
      Log[x]/b - Log[RemoveContent[b+c*x,x]]/b,
    If[PosQ[b^2-4*a*c] && PerfectSquareQ[b^2-4*a*c],
      With[{q=Rt[b^2-4*a*c,2]}, c/q * Int1111[Simplify[b/2-q/2],c,1,-1,x] - c/q * Int1111[Simplify[b/2+q/2],c,1,-1,x]],
    With[{q=1-4*Simplify[a*c/b^2]},
      If[RationalQ[q] && (EqQ[q^2,1] || Not[RationalQ[b^2-4*a*c]]),
        -2/b * Subst[Int[1/(q-x^2),x],x,1+2*c*x/b],
      -2 * Subst[Int[1/Simp[b^2-4*a*c-x^2,x],x],x,b+2*c*x]]]]]]]]],
  If[GtQ[p,0] && (IntegerQ[4*p] || IntegerQ[3*p]),
    (b+2*c*x)*(a+b*x+c*x^2)^p/(2*c*(2*p+1)) - p*(b^2-4*a*c)/(2*c*(2*p+1)) * Int1211[a,b,c,p-1,x],
  If[LtQ[p,-1] && (IntegerQ[4*p] || IntegerQ[3*p]),
```