```
> INT := proc(f::algebraic, x::name) local c, u, v, n, i;
    if diff(f,x) = 0 then
       return f*x;
    elif type(f, name) then
       if f=x then
            return (1/2)*x^2;
       else
            return f*x;
       fi;
    elif op(0, f) = `*` then
        c := 1;
        for i from 1 to nops(f) do
            if diff(op(i,f), x) <> 0 then
                u := op(i, f);
                v := subsop(i=1, f);
                break;
            fi
        od;

        for i from 1 to nops(v) do
            if type(op(i,v), numeric)then
                c:= op(i, v);
                v := subsop(i=1, v);
                break;
            fi
        od;

        if u = x and v = exp(x) then
             return c*(u*v - v)
        elif op(0, u) = `^` and v = exp(x) then
            n := op(2, u);
            v := op(2,f);
            return c*(u*v - n * INT(x^(n-1)*v, x));
        elif op(0, u) = `^` and op(0, v) = ln then
            return c*(INT(u, x)*v -  INT(INT(u, x)*diff(v, x), x)
);
        else
            return c* v * INT(u, x);
        fi;

    elif op(0, f) = `+` then
        return INT(op(1,f), x) + INT(f-op(1,f), x);

    elif op(0, f) = `^` and op(1, f) = x and diff(op(2,f), x) = 0
then
        c := op(2,f);
        if c = -1 then
            return ln(op(1,f));
        else
            return 1/(c+1)*x^(c+1);
        fi;

    elif op(0, f) = exp then
        u := op(1,f);
        if u = x then
            return exp(x);
```

```
            elif type(op(1,u), numeric) then
                return exp(x)*(1/op(1, u));
            fi;

        elif op(0, f) = ln and diff(op(1,f), x) <> 0 then
            u := op(1,f);
            c := lcoeff(u);
            return (1/c)*op(1,f)*(ln(op(1,f)) - 1);
        else return 'INT'(f, x);
        fi;
    end:
```

```
> INT( x^2 + 2*x + 1, x );
```

$$\frac{1}{3}x^3 + x^2 + x \tag{1}$$

```
>  INT( x^(-1) + 2*x^(-2) + 3*x^(-1/2), x );
```

$$\frac{1}{x^2}, 1$$

$$\frac{1}{\sqrt{x}}, 1$$

$$\ln(x) - \frac{2}{x} + 6\sqrt{x} \tag{2}$$

```
> INT( exp(x) + ln(x) + sin(x), x );
```

$$e^x + x\,(\ln(x) - 1) + INT(\sin(x), x) \tag{3}$$

```
> INT( 2*f(x) + 3*y*x/2 + 3*ln(2), x );
```

$$2\,INT(f(x), x) + \frac{3\,y\,x^2}{4} + 3\,x\ln(2) \tag{4}$$

```
> INT( x^2*exp(x)+ 2*x*exp(x), x );
```

$$x^2 e^x \tag{5}$$

```
> INT( 2*exp(-x) + ln(2*x+1), x );
```

$$-2\,e^x + \frac{(2x+1)\,(\ln(2x+1) - 1)}{2} \tag{6}$$

```
> INT( 4*x^3*ln(x) + 3*x^2*ln(x), x );
```

$$x^4\ln(x) - \frac{x^4}{4} + x^3\ln(x) - \frac{x^3}{3} \tag{7}$$