```
> F:=(1+2*x-3*x^2)/(1+x+4*x^2+4*x^3);
```

$$F := \frac{-3x^2+2x+1}{4x^3+4x^2+x+1} \tag{1}$$

```
> convert(F,parfrac,x);
```

$$\frac{x+9}{5\left(4x^2+1\right)} - \frac{4}{5\left(x+1\right)} \tag{2}$$

```
> convert(F,parfrac,x,I);
```

$$\frac{-\frac{1}{20}+\frac{9\,I}{10}}{-2x+I} + \frac{\frac{1}{20}+\frac{9\,I}{10}}{2x+I} - \frac{4}{5\left(x+1\right)} \tag{3}$$

```
> S:=series(F,x=0,50);
```

$$S := 1 + x - 8x^2 + 28x^4 + 4x^5 - 116x^6 - 12x^7 + 460x^8 + 52x^9 - 1844x^{10} - 204x^{11} + 7372x^{12} + 820x^{13} - 29492x^{14} - 3276x^{15} + 117964x^{16} + 13108x^{17} - 471860x^{18} - 52428x^{19} + 1887436x^{20} + 209716x^{21} - 7549748x^{22} - 838860x^{23} + 30198988x^{24} + 3355444x^{25} - 120795956x^{26} - 13421772x^{27} + 483183820x^{28} + 53687092x^{29} - 1932735284x^{30} - 214748364x^{31} + 7730941132x^{32} + 858993460x^{33} - 30923764532x^{34} - 3435973836x^{35} + 123695058124x^{36} + 13743895348x^{37} - 494780232500x^{38} - 54975581388x^{39} + 1979120929996x^{40} + 219902325556x^{41} - 7916483719988x^{42} - 879609302220x^{43} + 31665934879948x^{44} + 3518437208884x^{45} - 126663739519796x^{46} - 14073748835532x^{47} + 506654958079180x^{48} + 56294995342132x^{49} + O\left(x^{50}\right) \tag{4}$$

```
> a49:=coeff(%,x^49);
```

$$a49 := 56294995342132 \tag{5}$$

```
> 2^49;
```

$$562949953421312 \tag{6}$$

```
> a49/2^49;
```

$$\frac{14073748835533}{140737488355328} \tag{7}$$

```
> evalf(%);
```

$$0.1000000000 \tag{8}$$

```
> for n from 0 to 49 do
>    an:=coeff(S,x,n):
>    print([n,evalf(an/2^n)]); od:
```

$$[0, 1.]$$
$$[1, 0.5000000000]$$
$$[2, -2.]$$
$$[3, 0.]$$
$$[4, 1.750000000]$$
$$[5, 0.1250000000]$$
$$[6, -1.812500000]$$
$$[7, -0.09375000000]$$

[8, 1.796875000]
[9, 0.1015625000]
[10, −1.800781250]
[11, −0.09960937500]
[12, 1.799804688]
[13, 0.1000976562]
[14, −1.800048828]
[15, −0.09997558594]
[16, 1.799987793]
[17, 0.1000061035]
[18, −1.800003052]
[19, −0.09999847412]
[20, 1.799999237]
[21, 0.1000003815]
[22, −1.800000191]
[23, −0.09999990463]
[24, 1.799999952]
[25, 0.1000000238]
[26, −1.800000012]
[27, −0.09999999404]
[28, 1.799999997]
[29, 0.1000000015]
[30, −1.800000001]
[31, −0.09999999963]
[32, 1.800000000]
[33, 0.1000000001]
[34, −1.800000000]
[35, −0.09999999998]
[36, 1.800000000]
[37, 0.1000000000]
[38, −1.800000000]
[39, −0.1000000000]
[40, 1.800000000]
[41, 0.1000000000]
[42, −1.800000000]
[43, −0.1000000000]
[44, 1.800000000]
[45, 0.1000000000]
[46, −1.800000000]
[47, −0.1000000000]
[48, 1.800000000]
[49, 0.1000000000]

(9)