Integration of the logarithmic part using Trager-Rothstein .

```
> c := x^4-3*x^2+6:  d := x^6-5*x^4+5*x^2+4:
> Int(c/d,x);
```

$$\int \frac{x^4 - 3\,x^2 + 6}{x^6 - 5\,x^4 + 5\,x^2 + 4}\,dx$$

```
> gcd(d,diff(d,x)); # check that d is square-free
```

$$1$$

```
> Rz := resultant( c-z*diff(d,x), d, x );
```

$$Rz := 2930944\,z^6 + 2198208\,z^4 + 549552\,z^2 + 45796$$

```
> Rz := factor( Rz );
```

$$Rz := 45796\,\left(4\,z^2 + 1\right)^3$$

```
> alpha := {solve( 4*z^2+1, z )};
```

$$\alpha := \left\{\frac{1}{2}\,\mathrm{I},\ -\frac{1}{2}\,\mathrm{I}\right\}$$

```
> v[1] := gcd(c-alpha[1]*diff(d,x),d);
```

$$v_1 := x^3 + x^2\,\mathrm{I} - 3\,x - 2\,\mathrm{I}$$

```
> v[2] := gcd(c-alpha[2]*diff(d,x),d);
```

$$v_2 := x^3 - \mathrm{I}\,x^2 - 3\,x + 2\,\mathrm{I}$$

```
> TR := alpha[1]*log(v[1]) + alpha[2]*log(v[2]);
```

$$TR := \frac{1}{2}\,\mathrm{I}\,\ln\left(x^3 + x^2\,\mathrm{I} - 3\,x - 2\,\mathrm{I}\right) - \frac{1}{2}\,\mathrm{I}\,\ln\left(x^3 - \mathrm{I}\,x^2 - 3\,x + 2\,\mathrm{I}\right)$$

```
> simplify( diff(TR,x)-c/d );
```

$$0$$