

Using the Euclidean algorithm to compute the resultant

```
> A := randpoly(x,degree=5,dense);  
B := randpoly(x,degree=5,dense);  
r := resultant(A,B,x);
```

$$A := 68x^5 - 10x^4 + 31x^3 - 51x^2 + 77x + 95$$

$$B := x^5 + x^4 + 55x^3 - 28x^2 + 16x + 30$$

$$r := -956123557049826225$$

```
> res := proc(A,B,x) local m,n,l,R,bn,r;  
m,n := degree(A,x),degree(B,x);  
if n=0 then return B^m; fi;  
if m<n then return (-1)^(m*n)*res(B,A,x); fi;  
R := rem(A,B,x);  
if R=0 then return 0; else l := degree(R,x); fi;  
bn := coeff(B,x,n);  
l := degree(R,x);  
print(m,n,R);  
r := (-1)^(n*(m-l))*bn^(m-l)*res(R,B,x);  
end;
```

```
> res(A,B,x);
```

$$5, 5, -78x^4 - 3709x^3 + 1853x^2 - 1011x - 1945$$

$$5, 4, \frac{13946533}{6084}x^3 - \frac{6977453}{6084}x^2 + \frac{1205525}{2028}x + \frac{7244815}{6084}$$

$$4, 3, -\frac{371517739073676}{194505782720089}x^2 + \frac{281140993477656}{194505782720089}x + \frac{386731315559160}{194505782720089}$$

$$3, 2, \frac{77712524437561048652252279875}{22686625648654832820932964}x + \frac{40897317886862089227603963065}{22686625648654832820932964}$$

$$2, 1, \frac{867648688505987197442056649828245542967236}{1241965430539310560624008009820595074305625}$$

$$-956123557049826225$$

```
> Bnd := `resultant/bound`(A,B,x);
```

$$Bnd := 143161325120846158463$$

```
> R,M := 0,1;  
p := 1000;  
while M<2*Bnd do  
p := nextprime(p);  
if irem(lcoeff(A,x),p)=0 then next fi;  
r := Resultant(A,B,x) mod p;  
R,M := chrem([r,R],[p,M]), p*M;
```

```
od;
```

```
mods(R,M);
```

$$-956123557049826225$$