The Primitive Euclidean Algorithm in $\mathbb{Z}[x]$

```
> d := 20:
  c := rand(10^10):
> a := randpoly(x,dense,degree=20,coeffs=c);
```

$$a := 2929647161\,x^{20} + 2479117917\,x^{19} + 9307579341\,x^{18} + 2738017268\,x^{17} + 6330303476\,x^{16} + 6915535607\,x^{15} + 3856083492\,x^{14} + 2266271948\,x^{13} + 9571717816\,x^{12} + 8137165017\,x^{11} + 120392511\,x^{10} + 1920136592\,x^{9} + 8121202386\,x^{8} + 8333995623\,x^{7} + 4621286048\,x^{6} + 594985212\,x^{5} + 7902937222\,x^{4} + 3936879051\,x^{3} + 3880905941\,x^{2} + 1196395351\,x + 7229708228 \quad (1)$$

```
> b := randpoly(x,dense,degree=d,coeffs=c):
> r[0] := a:
  r[1] := b:
  k := 1:
  while r[k] <> 0 do
      printf("k=%2d  deg=%2d  size=%6d digits\n",
        k, degree(r[k]), length(maxnorm(r[k])) );
      r[k+1] := primpart( prem(r[k-1],r[k],x), x );
      k := k+1;
  od:
k= 1  deg=20  size=    10 digits
k= 2  deg=19  size=    20 digits
k= 3  deg=18  size=    39 digits
k= 4  deg=17  size=    58 digits
k= 5  deg=16  size=    76 digits
k= 6  deg=15  size=    97 digits
k= 7  deg=14  size=   117 digits
k= 8  deg=13  size=   138 digits
k= 9  deg=12  size=   158 digits
k=10  deg=11  size=   178 digits
k=11  deg=10  size=   197 digits
k=12  deg= 9  size=   216 digits
k=13  deg= 8  size=   237 digits
k=14  deg= 7  size=   257 digits
k=15  deg= 6  size=   277 digits
k=16  deg= 5  size=   298 digits
k=17  deg= 4  size=   318 digits
k=18  deg= 3  size=   338 digits
k=19  deg= 2  size=   357 digits
k=20  deg= 1  size=   377 digits
k=21  deg= 0  size=     1 digits
```