Algorithm ModGcd.

Inputs $a, b \in \mathbb{Z}[x] \setminus \{0\}$, $\text{cont}\, a = 1$, $\text{cont}\, b = 1$.
Output $g = \gcd(a,b)$

$\gamma \leftarrow \gcd(\text{lc}\, a, \text{lc}\, b) \in \mathbb{Z}$
$G \leftarrow 0$ # CRT applied to previous images g_i
$M \leftarrow 1$ # product of previous primes

Loop: pick a new prime p s.t. $p \nmid \text{lc}\, a$.
$g_p \leftarrow \gcd(\phi_p(a), \phi_p(b)) \in \mathbb{Z}_p[x]$
if $\deg g_p = 0$ then output 1.
$g_p \leftarrow \phi_p(\gamma) \cdot g_p \bmod p$

if $G = 0$ then $G \leftarrow g_p$; $M \leftarrow p$;
elif $\deg g_p > \deg G$ then # p is unlucky
elif $\deg g_p < \deg G$ then # all previous primes
$G \leftarrow g_p$; $M \leftarrow p$; # are unlucky
else
Solve $\{u \equiv G \bmod M,\ u \equiv g_p \bmod p\}$
for u in the symmetric range mod $M \cdot p$.
if $u = G$ then
$g \leftarrow u / \text{cont}(u)$
if $g \mid a$ and $g \mid b$ then output g.
$G \leftarrow u$; $M \leftarrow M \cdot p$
end if
go to LOOP.