„Improving incremental signature-based Gröbner basis algorithms“ by Christian Eder

The author presents improvements of incremental signature-based algorithms to compute a Gröbner basis of a polynomial ideal which considerably speed up their performance . The experimental results in chapter 6 are impressive.
The theoretical part of this paper is heavily based on references [5] and [6]. New are Theorem 5.2 and Corollary 5.4 in Chapter 5. Chapters 2-4 give an overview of known results. They should be written more carefully.
The paper contains several misprints, even in the short Abstract (3rd line: „psotive affect“ instead of „positive effect“).
Some formulations should be improved, e.g.:

- Definition 2.1, 1. „the set of all signatures “ should be either omitted or be replaced by „the set of all potential signatures“
- Definition 2.1, 2. Replace „$p \in \mathcal{R}$“ by „$p \in I_{i+1}$“
- Definition 2.1, 3 is not necessary, since $\mathcal{R}^i$ is in a natural way an $\mathcal{R}$-module
- Definition 2.1, 5. Is every pair of labeled polynomials a critical pair?
- Definition 2.2. Omit „number of elements of $G = \ell$“, since the letter ℓ has a different meaning in the following lines.
- Definition 2.2., 1. should be changed to: ... if there exist $\ell \in \mathbb{N}$, $t_1, \ldots, t_\ell \in \mathcal{M}$, $c_1, \ldots, c_\ell \in \mathcal{K}$, $r_1, \ldots, r_\ell \in \mathcal{S} \times I_{i+1}$, $g_1, \ldots, g_\ell \in G$ such that for all $j \in \{1, \ldots, \ell\}$
  (a) $r_0 = f$, $r_j = r_{j-1} - c_j t_j g_j$, $r_\ell = g$, (b) ...
- Remark 2.3, 1. ... sig-safe to 0 modulo ... (not: to g).
- Remark 2.3, 2 is superfluous
- In Lemma 2.5 t_h and u_h should be defined.
- In the formulation of Theorem 5.2 „let $\ell+1$ be the current index of labeled polynomials“ is superfluous (it should be transferred to the proof).
- Corollary 5.4. $lm(s)$ is not a syzygy, but its leading monomial.
- ...
- ...

Conclusion: I recommend to publish this paper in revised form. It should be written much more carefully and possibly be shortened.