A robust class of regular languages

Antonio Cano Gómez[1] and Jean-Éric Pin[2]⋆

[1] Departamento de Sistemas Informáticos y Computación, Universidad Politécnica de Valencia, Camino de Vera s/n, P.O. Box: 22012, E-46020 - Valencia.
[2] LIAFA, Université Paris-Diderot and CNRS, Case 7014, 75205 Paris Cedex 13, France.

Abstract. In this survey paper, we present known results and open questions on a proper subclass of the class of regular languages. This class, denoted by $\mathcal{W}$, is especially robust: it is closed under union, intersection, product, shuffle, left and right quotients, inverse of morphisms, length preserving morphisms and commutative closure. It can be defined as the largest positive variety of languages not containing the language $(ab)^*$. It admits a nontrivial algebraic characterization in terms of finite ordered monoids, which implies that $\mathcal{W}$ is decidable: given a regular language, one can effectively decide whether or not it belongs to $\mathcal{W}$. We propose as a challenge to find a constructive description and a logical characterization of $\mathcal{W}$.