AN ALGORITHM TO MINE NORMALIZED WEIGHTED SEQUENTIAL PATTERNS
USING A PREFIX-PROJECTED DATABASE

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Key words: data mining, frequent sequential patterns, weighted, sequential patterns.

Abstract. Sequential pattern mining is an important subject in data mining with broad applications in many
different areas. However, previous sequential mining algorithms mostly aimed to calculate the number of
occurrences (the support) without regard to the degree of importance of different data items. In this paper, we
propose to explore the search space of subsequences with normalized weights. We are not only interested in the
number of occurrences of the sequences (supports of sequences), but also concerned about importance of sequences
(weights). When generating subsequence candidates we use both the support and the weight of the candidates
while maintaining the downward closure property of these patterns which allows to accelerate the process of
candidate generation.

* This work is sponsored by a research grant from Vietnam National University, Hanoi (QG.15.41).

ON THE REMAINDERS OBTAINED IN FINDING THE GREATEST COMMON DI-
VISOR OF TWO POLYNOMIALS

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Key words: Polynomial Remainder Sequence (PRS), Sylvester’s matrices, Euclidean PRS, Subresultant PRS,
Sturm sequence, Modified Subresultant PRS.

Abstract. In 1917 Pell¹ and Gordon used sylvestre². Sylvester’s little known and hardly ever used matrix of
1853, to compute² the coefficients of a Sturmian remainder — obtained in applying in Q[x], Sturm’s algorithm

¹See the link http://en.wikipedia.org/wiki/Anna_Johnson_Pell_Wheeler for her biography.
²Both for complete and incomplete sequences, as defined in the sequel.
on two polynomials $f, g \in \mathbb{Z}[x]$ of degree $n$ — in terms of the determinants$^3$ of the corresponding submatrices of \texttt{svylvester2}. Thus, they solved a problem that had eluded both J. J. Sylvester, in 1853, and E. B. Van Vleck, in 1900.$^4$

In this paper we extend the work by Pell and Gordon and show how to compute$^2$ the coefficients of an Euclidean remainder — obtained in finding in $\mathbb{Q}[x]$, the greatest common divisor of $f, g \in \mathbb{Z}[x]$ of degree $n$ — in terms of the determinants$^5$ of the corresponding submatrices of \texttt{svylvester1}, Sylvester’s widely known and used matrix of 1840.

$^*$ Partially supported by the Russian Foundation for Basic Research, grant No. 16-07-00420a.

DISTANCE DISTRIBUTIONS AND ENERGY OF DESIGNS IN HAMMING SPACES
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\textit{Key words}: Designs in Hamming spaces, distance distribution, energy.

\textbf{Abstract.} We obtain new combinatorial upper and lower bounds for the potential energy of designs in $q$-ary Hamming space. Combined with results on reducing the number of all feasible distance distributions of such designs this gives reasonable good bounds. We compute and compare our lower bounds to recently obtained universal lower bounds. Some examples in the binary case are considered.

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$^{**}$ The research of the second and third authors was partially supported by the SF of Sofia University under Contract 144/2015.

LOWER BOUNDS ON THE DIRECTED SWEEPWIDTH OF PLANAR SHAPES$^*$
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\textit{Key words}: decontamination, sweepwidth, lower bounds.

\textbf{Abstract.} We investigate a recently introduced width measure of planar shapes called sweepwidth and prove a lower bound theorem on the sweepwidth.

$^*$ This paper is partially supported by the Scientific Fund of Sofia University under grant 145/2015.

ON THE TIME COMPLEXITY OF THE PROBLEM RELATED TO REDUCTS OF CONSISTENT DECISION TABLES$^*$
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$^3$ Also known as \textit{modified} subresultants.

$^4$ Using determinants Sylvester and Van Vleck were able to compute the coefficients of Sturmian remainders \textit{only} for the case of \textit{complete} sequences.

$^5$ Also known as (proper) subresultants.
Abstract. In recent years, rough set approach computing issues concerning reducts of decision tables have attracted the attention of many researchers. In this paper, we present the time complexity of an algorithm computing reducts of decision tables by relational database approach. Let $DS = (U, C \cup \{d\})$ be a consistent decision table, we say that $A \subseteq C$ is a relative reduct of $DS$ if $A$ contains a reduct of $DS$. Let $s = (C \cup \{d\}, F)$ be a relation schema on the attribute set $C \cup \{d\}$, we say that $A \subseteq C$ is a relative minimal set of the attribute $d$ if $A$ contains a minimal set of $d$. Let $Q_d$ be the family of all relative reducts of $DS$, and $P_d$ be the family of all relative minimal sets of the attribute $d$ on $s$. We prove that the problem whether $Q_d \subseteq P_d$ is co-NP-complete. However, the problem whether $P_d \subseteq Q_d$ is in $P$.

* This work is sponsored by a research grant from Vietnam National University, Hanoi (QG.15.41).