

Listing Monomials in Lexicographical Order

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Let MON_n be the set of monomials that can be formed using n variables u_1, \dots, u_n .

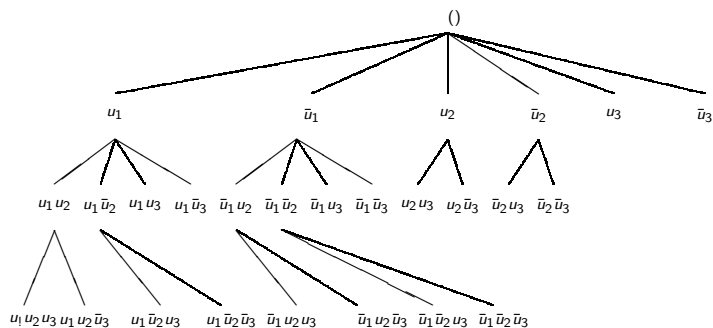
We start from the ordered list of literals:

$$u_1, \bar{u}_1, u_2, \bar{u}_2, \dots, u_n, \bar{u}_n,$$

and construct a the *Rymon tree*:

- the root of the tree is the empty monomial $()$;
- if μ is a monomial that labels a node and the largest literal in μ is u_i then the node is expanded with all literals that follow u_i in the list (except \bar{u}_i);
- if μ is a monomial that labels a node and the largest literal in μ is \bar{u}_i , then the node is expanded with all literals that follow \bar{u}_i in the list.

Example



Obtaining The List of Monomials

The nodes of the tree are visited in preorder. For the tree in the example we obtain the following list:

$$\begin{aligned} &(), u_1, u_1 u_2, u_1 u_2 u_3, u_1 u_2 \bar{u}_3, \\ &u_1 \bar{u}_2, u_1 \bar{u}_2 u_3, u_1 \bar{u}_2 \bar{u}_3, \\ &u_1 u_3, u_1 \bar{u}_3, \\ &\bar{u}_1, \bar{u}_1 u_2, \bar{u}_1 u_2 u_3, \bar{u}_1 u_2 \bar{u}_3, \\ &\bar{u}_1 \bar{u}_2, \bar{u}_1 \bar{u}_2 u_3, \bar{u}_1 \bar{u}_2 \bar{u}_3, \\ &\bar{u}_1 u_3, \bar{u}_1 \bar{u}_3, \\ &u_2, u_2 u_3, u_2 \bar{u}_3, \\ &\bar{u}_2, \bar{u}_2 u_3, \bar{u}_2, \bar{u}_3, \\ &u_3, \\ &\bar{u}_3 \end{aligned}$$

References

Consult [1]



D. Simovici and C. Djeraba.

Mathematical Tools for Data Mining.

Springer, London, 2008.