THE LD AND DLAD BIO-OPERATIONS ON FORMAL LANGUAGES [1]

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ABSTRACT

We continue the language theoretic study of operations suggested by the gene unscrambling process in stichotrichous ciliates. One of the two complementary models of gene unscrambling is based on operations inspired by the ways in which a DNA molecule can fold: *hi* (hairpin loop with inverted pointers) which reverses a substring between a pointer sequence and its reverse, *ld*(loop with direct pointers)-excision which deletes a substring between two pointers and *dlad*(double loop with alternating direct pointers)-excision / reinsertion which swaps two substrings marked by pointer-pairs. We specifically consider the closure properties of several families of languages under the operations ld and *dlad* and the solvability of language equations involving these operations.

Keywords: Theoretical DNA computing, bio-operations, closure properties, formal languages, decision questions