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ABSTRACTION AND REMOTE CONTROL

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SORD is proposed for the evaluation of a system of Boolean formulas using a
gram with a loop in which some parameters generated by a previously created
by are successively passed to a special procedure. The program with a loop is
ned a cyclic binary program, and the procedure is termed a tunable binary
reduce. Basic design principles and complexity bounds are considered.

INTRODUCTION

rice is an ever-growing interest in program realization of systems of Boolean functions
sing compilers [1, 2] and interpreters [3]. Interpretation is the more promising
in those cases when no special requirement are imposed on the time characteristics
ogram. An interpreter is independent of the Boolean functions being realized, and
ons are specified by an array [3]. However, the generation and updating of such
for the specification of SBF with many variables and formulas is an arduous and
uming task. If we can abstract from issues of time and memory optimization, which
imary concern of [1, 3], and focus on simplicity of the realizing procedure (as in
ila method proposed in [1]), the interpreter may be designed as a cyclic program
cludes a general-purpose compiler procedure with parameters. Then the specified SBF
resented by a table (array) of parameters, and formula evaluation reduces to
quential enumeration of the table rows and substitution of the row parameters
eral-purpose procedure.

this article we consider some principles of organization and construction of tunable
orecurs, parameter tables, and cyclic binary programs for SBF evaluation. Approx-
plexity bounds are given.

One Binary Procedures

ider a SBF of the form

\[ W_i = Z_i \lor Z_j \lor Z_k; \quad W_i = Z_i Z_j \lor Z_k; \]

\[ W_i = (Z_i \lor Z_j) Z_k; \quad W_i = Z_i Z_j Z_k. \] (1)

ese 1 presents graph-schemas (GS) of simple binary programs realizing these formulas.
ombine the GS of the separate formulas into a generalized GS (Fig. 2a), which con-
a simple binary program with four inputs and one output (Fig. 2b). To reduce the
ps, we introduce the additional variables \( Z_a \) and \( Z_s \), which are called formula-
arameters: \( Z_a = Z_s = 1 \) tune to \( W_1 \), \( Z_a = 1 \) and \( Z_s = 0 \) tune to \( W_2 \), \( Z_a = 0 \) and \( Z_s = 1 \)
and \( Z_a = Z_s = 0 \) tune to \( W_4 \). Supplemnting the GS with three nodes (Fig. 2c), we
he GS of a binary program which constitutes a procedure evaluating any of the
in (1); this procedure may be utilized as a subprogram with the parameters \( Z_a \) and
ay be designed as a function subprogram since computations with any of the formulas
the value of \( W \) equal to 1 (0). The resulting function procedure (Fig. 2c) will be
uble binary procedure (TBP), which we denote by \( W = W(Z_a, Z_s) \). Its tuning in-
assigning the constant values 1 and 0 to the parameters \( Z_a \) and \( Z_s \). The formulas (1)
evaluated using the following relationships:

\[ W_i = W(1,1); \quad W_i = W(1,0); \quad W_i = W(0,1); \quad W_i = W(0,0). \] (2)

GS in Fig. 2c realizes the function

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