

(, MySQL [12], [13, 19], Oracle [14-15, 92-93], DB2 [16], PostgreSQL [17]). [9],

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1.

40

[1],

(M. Jarke) (J. Koch)
253 [2], (M. V. Mannino), (P. Chu)
(T. Sager) – 64) [3], (Y. E. Ionnidis) – 50
[4], (S. Chaudhari) – 61 [5], – 128 [6].

(G. Graefe) [7, 6, 11, 14], (C. Date) [8,
c . 639-690], (M. Ozsu) (P. Valduriez) [9, pp. 228-
273], (R. Ramakrishnan) (J. Gehrcke) [10, pp. 412-
413].

[11].

i
ii
iii
iv

[18],

[19],

[20].

[2],

» [4, p. 1041].

[21],

Oracle,

« »

DB2

[, 22, . 417-445].

Starburst

[16].

[2, 3],
[23-24]).

2.

[25].

1990- 1980- ..

1

« » (rewriting) [4, p. 1044].

[19], ..

3.1], [2,

W3C [26], XQuery

[27-30],

[31].

: OQL [32-33]

XQuery [34-37].
XML-

[38-39].

[2, 40].

[41].

[42] () [43].

(, [44-47]).

[2, 4], [5, 4.1] [20].

SELECT-FROM-WHERE

P2

[8, . 683]:

```
SELECT S.Name
FROM S
```

WHERE S.S# IN (SEL query optimization; query simplification; lexical query optimization; magic sets

```
ECT SP.S#
FROM SP
WHERE SP.P# = 'P2');
```

```
SELECT S.Name
FROM S, SP
WHERE S.S# =SP.S#
AND SP.P# = 'P2';
```

[48]. 5

[48]

[49-51].

[52].

[48],

53-54].

OQL [32-33] XQuery [34-35,

[8, . 682-684], [5, 4.2.2] [35, 2].

[55-56].

3.

X > 10
Y
X > Y

« »

« »

SIPS

(Sideways Information Passing Strategy),

« »

« » « », « » - « »
».

[59]:

«Datalog»[57],
(rules)

(facts).

magic(x),

```
SELECT Ename FROM emp e1
WHERE Job = "Sr Programmer" AND
Sal > (SELECT AVG(e2.Sal)
FROM emp e2
WHERE e2.Dno =e1.Dno)
```

e1 e2 e2

(free). [58]

n-
b (bonded) f
c (condition),
X

```

SELECT Ename FROM s_mag, mag_avgsal
WHERE Sal > Asal AND s_mag.Dno = mag_avgsal.Dno
mag_avgsal(Dno, Asal) AS
(SELECT Dno, AVG(Sal)
FROM mag, emp
WHERE mag.Dno = emp.Dno GROUPBY Dno)
mag(Dno) AS
(SELECT DISTINCT Dno
FROM s_mag)
s_mag(Ename, Dno, Sal) AS
(SELECT Ename, Dno, Sal FROM emp
WHERE Job = "Sr Programmer")

```

b- ,

Datalog, -

[62-64].

[65],

« » Datalog SQL [66, 67] ..

XML-

[68, 69].

4.

[59],

« »

c

Datalog [60].

« » ..

: « »

[61].

« »

[72-73].

: «

» [61].

[5, 7.3]. [19, 74-75],

[76],

MySQL [81], PostgreSQL [82] Oracle [21, PostgreSQL p. 9].

X1 AND X2 ... AND Xn

NP-

MySQL 5.5 [12],

(P. A. V. Hall) [41],

((a AND b) AND c OR (((a AND b) AND (c AND d)))) = > (a AND b AND c) OR (a AND b AND c AND d).

a AND b AND c,

X OR (X AND a) = > X.

-
-
-
-

1950- [83, 84] ([1]), [85-86].
 (Quin-McCluskey) [85-86] [87, p. 234], [88], [89, 171-172.]. [90-92]

[77].

[77].

[78, 79].

[80].

[43,

4.5],

[73].

(),
 ;
 •
 ,
 [93, 2] Oracle
 « » (« X
 Y, Y X
) X» [93, p. 1368].

XQuery,
 XML-
 XQuery-
 [34,
 35] XQuery,
 [41]. [54]
 XQuery-
 [30]
 XQuery-

5.

,
 : «
 , ERP-
 (Data-warehouses).
 » [94, p. 961].

•
 •
 •
 •
 •
 •
 •
 XQuery,
 XML,
 [90],

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An Overview of Evolution of Lexical Query Optimization Techniques

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Abstract. The presented overview is concerned with lexical query optimization and covers papers published in the last four decades. The paper consists of five sections. The first section – Introduction – classifies query optimization techniques into semantic optimizations and lexical optimizations. Semantic optimizations usually relies on data integrity rules that are stores within metadata part of databases, and on data statistics. This kind of optimizations is discussed in many textbooks and papers. Lexical optimizations (more often called rewriting) use only a text of query and no other information about database and its structure. Lexical optimizations are further classified into query transformations, query amelioration, and query reduction. The second section of the paper discusses techniques of query transformation such as predicate pushdown, transformation of nested query into query with joins, etc. Query amelioration is a topic of the third section with a focus on magic set optimizations. The fourth section covers query reduction optimizations. The section briefly describes traditional approaches (such as tableau-based) and considers in more details three new algorithms proposed by authors. The fifth section concludes the paper.

Keywords: query optimization; query simplification; lexical query optimization; magic sets

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