Annual progress report ALAPEDES

Contract ERB–FMRX–CT 96–0074

CONTENTS

0 Introduction

0.1 The network

Alapedes is the acronym for ALgebraic Approach to Performance Evaluation of Discrete Event Systems. The theory of discrete event systems deals with dynamical systems that are *event-driven* as opposed to *time-driven*; usually their state variables take on only discrete values. Several approaches exist to study discrete event systems; of these the “logical” approach, where the *ordering* of the events is of interest, and the “timed” approach, where the *timing* of the events is also of interest for the mainstreams form the research within Alapedes

0.3 Legend

0.3.1 Partners

The Alapedes network consists of eight partners (one of which comprises two locations). They are frequently referred to, in which the following acronyms are utilized.

TUD – Technische Universiteit Delft, Delft, Nederland;

Cross-Fertilisation on The Theoretical Level

T-1 Representation problems
T-2 Stability problems
T-3 Optimisation problems
T-4 Control of automata
T-5 Large systems problems

Applications

A-1 Transportation systems
A-2 Manufacturing systems
A-3 Communication networks

Software

S-1 Investigation and critical analysis of existing software
S-2 Development of new software

0.3.3 Glossary

In the report the term (Alapedes) *partner* is used for the organizations that were listed in § 0.3.1; students preparing their graduation are called

1 Progress

Wang, and also by Gurvits (Institute for Advanced Studies, Princeton), that the supremum in the above equation be always attained. This statement is known as the *finiteness conjec-*

The group at KUL is currently working on modelling and control of highway tra□c. Also here, two types of tra□c models are studied in the scope of tra□c control: microscopic and macroscopic models.

In order to simulate tra□c in a reliable way, one need tra□c measurements to fit the mathematical models. The tra□c sensors are installed along the highway, and the acquired data need to be transported or manually collected. The KUL members studied the di□erent steps

Nevertheless, an example of application of (max, +)-system theory to production is now available in the demos of the (max, +)-Scilab-toolbox (see § 1.1.10). The performance evaluation of flowshops can be easily achieved. The resource optimization routine is still missing but we will provide one by the end of the Alapedes project.

1.1.8 A-3

Substantial progress was made this year in connection with performance analysis of telecommunications protocols using combinatorial methods. In close contact with Dornstetter (head of Nortel Networks' research and development departement) and Thibon (Université de

conjectures, to mention a few). The second one is that the applications concentrate on tra□c control (as evidenced by results from INRIA, KUL and TUD), and on characterisation of packet flows on networks (INRIA).

1.3 Networking and coordination

1.3.1 General coordination

E-mail Day-to-day contact between

with n nodes). They provide recurrence formulæ (on n) for the bivariate series in the case of $L(K_n)$.

Ioannis Michos has presented his work at the Alapedes convention at Delft in October,

2.1 Scientific speciality

All Alapedes partners are involved via a mathematics department; most of them have

Remco de Vries	[142, 271, 144, 143, 220, 273, 272]
Stéphane Perennes	[176, 178, 221, 243, 245, 244, 246]
Matthias Kanta	[]
Eleni Katirtzoglou	[53, 52] [223, 224]
Michael Mc Gettrick	[124, 248, 249]
Bernd Heidergott	[70, 50, 55] [208, 206, 207, 205, 214, 217, 216, 215, 212, 211, 209, 213, 220, 210, 218, 219] [168, 169, 170, 228]

name	*period involved*	*share*	*partner*
scientific teamleaders			
Geert Jan Olsder	961001 –	10 %	TUD
Guy Cohen	961001 –	50 %	ENPC
François Baccelli	961001 –	50 %	INRIA - SA
Jean-Pierre Quadrat	961001 –	50 %	INRIA-Rocq
Bart de Moor	961001 –	5 %	KUL
Jeremy Gunawardena	961001 –	10 %	HP

Daniel Kro-1.811-27.099Td[(scien)32(ti)-1(fic)-383(te)-1(amleaders)]TJ/F15(r7hve)J/FF1EAFTd[(J

B Publications

Remark: All entries beyond [77] were already given in (a) previous annual re-

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[245]

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The next table gives some information about visits to scientists outside the network by partners of Alapedes

D Delft convention

SCHEDULE

Friday 1 October 1999

9:50	Wellcome; opening remarks
10:00	"Non-ambiguous Petri Nets" Bruno Gaujal and *Stefan Haar, INRIA
10:30	"Expansions for Joint Characteristics of Stationary Waiting Times in (max, +)- Linear with Poisson Input" *Hayriye Ayhan, Georgia Institute of Technology

E Tropical algebra seminar

F Hamburg convention

ALAPEDES convention Hamburg

PROGRAMME

Saturday, 8th July, 2000

Optimisation problems INRIA

09:30 – 10:15 T–3 Stefan Haar (with H. Voelzer)