Ninth Amsterdam Colloquium
December 14 — 17, 1993

Program and Abstracts

ILLC/Department of Philosophy
University of Amsterdam

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Organizing Committee
Ninth Amsterdam Colloquium:
Paul Dekker, Herman Hendriks
Marjorie Pigge, Martin Stokhof

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The Ninth Amsterdam Colloquium

The 1993 edition of the Amsterdam Colloquium is the ninth in a series which started in 1976. Originally an initiative of the Department of Philosophy, the colloquium is now organized by the Institute for Logic, Language and Computation (ILLC), in which the Departments of Mathematics and Computer Science, the Department of Philosophy and the Department of Computational Linguistics of the University of Amsterdam cooperate. For the organization of the Ninth Amsterdam Colloquium additional financial support was received from the Royal Dutch Academy of Science (KNAW), the ESPRIT Basic Research Project 6852 DYANA, the European Association for Logic, Language and Information (FoLLI), and the Faculty of Arts, which is gratefully acknowledged.

Locations

The Colloquium takes place in the immediate surroundings of the BINNENGASTHUISTERREIN, where the Department of Philosophy resides. The locations can be reached by public transportation as follows. Take tramline 4, 9, 16, 20, 24 or 25 and get off at stop 'Spui' (you can ask the driver to announce that stop). (Coming from the Central Station, the Spui is the second stop.)

The registration office and lectures rooms are in the OUDEMANHUISPOORT. Coming from the Spui, take the narrow street with the diamond factory with the windmill at the corner. This street is called 'Langebrugsteeg'. When you have passed two bridges, turn left and immediately you find on your right hand a gate which gives access to the OUDEMANHUISPOORT.

In order to reach the Department of Philosophy also take the Langebrugsteeg from the Spui. After passing the two bridges, you find on your right hand the gate through which one enters the area called BINNENGASTHUISTERREIN. Coming through the gate you pass the ATRIUM (the university restaurant), go left and just before the next gate you go right. You then enter a small courtyard, where the entrance of the department is located.

All locations are marked on the map overleaf.

The lectures are held in the building the OUDEMANHUISPOORT. Address: Oudemanhuispoort 4–6, Amsterdam, (020) 5253361 (porter).

The lectures are given in the rooms: A0.08, C0.17, C1.17, C2.17, D0.09, D1.08, D1.18, and F2.01C. The first *character* of a roomnumber indicates a subbuilding of the OUDEMANHUISPOORT, the first *number* the floor (where 0 means ground floor).

Coffee and tea are served in the OUDEMANHUISPOORT in room EK.01 and EK.01A. This is in subbuilding E, basement. ('K' stands for 'kelder', which is dutch for basement.)

For a map of the OUDEMANHUISPOORT, cf., page 5.

Lunches are served in the ATRIUM, the university restaurant at the BINNENGASTHUISTERREIN. Lunches are served from 12.30 – 14.00. Please note that the conference fee includes all costs of lunch, except those of alcoholic beverages.

Registration

All participants are requested to get their conference papers and lunch-tickets on Tuesday morning at the registration desk in room EK.01 in the Oudemanhuispoort (in the basement of subbuilding E). The registration desk is open from 9.30.

Reception

Tuesday evening, from 18.30 to 19.30, the participants are offered a reception in the Agnietenkapel, Oudezijdsvoorburgwal 231.

Further information

For any further questions, please contact:

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Ninth Amsterdam Colloquium
Program

	Tuesday 14	
9.30	*Registration and coffee*	
10.30	*Opening by Johan van Benthem* (D0.09)	
11.00 – 11.40	*Kees van Deemter* Sorites and the Context-dependence of Vague Predicates (C1.17)	*Michael Moortgat and Richard Oehrle* Order, Dependency, Connectedness: Parameters of Multimodal Inference (A0.08)
11.50 – 12.30	*Dorit Ben-Shalom* Natural Language, Generalized Quantifiers and Modal Logic (C1.17)	*Paul Buitelaar and Anne-Marie Mineur* Compositionality and Coercion in Categorial Grammar (A0.08)
lunch		
14.00 – 14.40	*Fabio Pianesi and Achille C. Varzi* The Mereo-topology of Event Structures (C1.17)	*Erkan Tın and Varol Akman* BABY-SIT: A Computational Medium Based on Situations (D1.18)
14.50 – 15.30	*Sheila Glasbey* Progressives, Events and States (C1.17)	*Theo M.V. Janssen* Synchronous TAG-Grammars and Montague Grammar (D1.18)
tea		
16.00 – 16.40	*Patrick Blackburn, Claire Gardent and Maarten de Rijke* Back and Forth Through Time and Events (C1.17)	*Enric Vallduví and Ron Zacharski* Accenting Phenomena, Association with Focus, and the Recursiveness of Focus-ground (D0.09)
16.50 – 17.50	*David Israel* The Very Idea of Dynamic Semantics (D0.09)	

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	Wednesday 15	
9.30	*Jens-Erik Fenstad* Structure and Meaning - on Mathematical Models for Natural Languages (D0.09)	
coffee		
11.00 – 11.40	*Rens Bod, Martin van den Berg and Remko Scha* A Data Oriented Approach to Semantics (C1.17)	*Tim Fernando* Generalized Quantifiers as Second-order Programs — "Dynamically" Speaking, Naturally (A0.08)
11.50 – 12.30	*Jan Odijk* Syntactic Generalizations in Compositional Grammars (C1.17)	*Martin H. van den Berg* A Direct Definition of Generalized Dynamic Quantifiers (A0.08)
lunch		
14.00 – 14.40	*Victor Sanchez Valencia, Ton van der Wouden and Frans Zwarts* Polarity and the Flow of Time (F2.01C)	*Erik Aarts* Parsing Second Order Lambek Grammar in Polynomial Time (A0.08)
14.50 – 15.30	*Arie Molendijk* Temporal Orientation, Temporal Ordering and Tense Use in English and French (F2.01C)	*Martin Emms* Extraction Covering Extensions of Lambek Calculus are not CF (A0.08)
tea		
16.00 – 16.40	*Görel Sandström* Consequentiality, Subevents and Temporal Relations: the Cases of *When* and *Then* (D0.09)	*A. Kurucz, I. Németi, I. Sain and A. Simon* The Weakest Modal Logic Embedding Lambek Calculus is Undecidable (A0.08)
16.50 – 17.50	*Hans Kamp* Syntax-Semantics Interface: Where do variables come from and what is to happen to them? (D0.09)	

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	Thursday 16	
9.30	*Erhard Hinrichs* The Syntax and Semantics of Partial-VP Topicalization in German (D0.09)	
coffee		
11.00 – 11.40	*Pauline Jacobson* i-within-i Effects in a Variable-free Semantics and a Categorial Syntax (C2.17)	*Jan van Eijck* On Discourse Referents, Partial Models and Identity (C0.17)
11.50 – 12.30	*Anna Szabolcsi* Quantifiers in Pair-list Questions: Restrictions and Consequences (C2.17)	*Kjell Johan Sæbø* Anaphoric Presuppositions and Zero Anaphora (C0.17)
lunch		
14.00 – 14.40	*Henriëtte de Swart* Definite and Indefinite Generic NPs (C2.17)	*Ruy J.G.B. de Queiroz and Dov M. Gabbay* Equality in Labelled Deductive Systems and the Functional Interpretation of Propositional Equality (C0.17)
14.50 – 15.30	*Chris Fox* Individuals and Their Guises: a Property-theoretic Analysis (C2.17)	*Yde Venema* Labelled Categorial Grammar and Tree Models (C0.17)
tea		
16.00 – 16.40	*John Nerbonne* A Semantics for Nominal Comparatives (D1.08)	*Makoto Kanazawa* Comleteness and Decidability of the Mixed Style of Inference with Composition (C0.17)
16.50 – 17.50	*Mark Steedman* Intonation and Focus (D1.08)	

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	Friday 17	
9.30	*Mats Rooth* An Hybrid Architecture for the Theory of Focus (D0.09)	
coffee		
11.00 – 11.40	*Jerry Seligman* An Algebraic Appreciation of Venn Diagrams (A0.08)	*Richard Crouch* Tense in Simple Conditionals (F2.01C)
11.50 – 12.30	*Marcus Kracht* Syntactic Coding (A0.08)	*Dorit Abusch* Sequence of Tense Revisited: Two Semantic Analyses of Tense in Intensional Contexts (F2.01C)
lunch		
14.00 – 14.40	*H. Andréka, I. Németi and I. Sain* Craig Property of a Logic and Decomposability of Theories (C2.17)	*Reinhard Muskens* A Compositional Discourse Representation Theory (A0.08)
14.50 – 15.30	*Andrei Arsov and Maarten Marx* Sophia: halfway between Amsterdam and Budapest (C2.17)	*Daniel Hardt* Sense and Reference in Dynamic Semantics (A0.08)
tea		
16.00 – 16.40	*Philip H. Miller* Strong Generative Capacity as the Semantics of Linguistic Formalisms (D0.09)	*Jaap van der Does* The Dynamics of Sophisticated Laziness (A0.08)
16.50 – 17.50	*Barbara Partee* Towards a Typology of Quantificational Constructions (D0.09)	

Invited Speakers

Structure and Meaning - on Mathematical Models for Natural Languages

Jens-Erik Fenstad

Traditionally one has in the study of natural languages made a rough distinction between two modules: on the one hand a computational module, or grammatical space, which deals with the combination of discrete units, like words and morphemes, into larger units, and on the other hand a conceptual module, or semantic space. In the lecture I shall follow this tradition and review some current research on the mathematical structure of the two modules and on how they are to be combined. I will then place this research into the larger context of cognitive science and discuss some mathematical problems in this connection.

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The Syntax and Semantics of Partial-VP Topicalization in German

Erhard W. Hinrichs

Topicalization of partial verb phrases (PVPs), as in (1), has received considerable attention in German syntax (e.g. Haider 1990 in the GB-framework; Pollard 1990 and Nerbonne 1993 in the framework of HPSG).

(1) Ein Märchen erzählen wird er seiner Tochter müßen.
a fairy tale tell will he his daughter must
'He will have to tell his daughter a fairy tale.'

Under the usual assumption that a single constituent can be topicalized in German and is fronted via move-alpha (GB) or by a slash mechanism (HPSG), the PVP topicalization in (1) can be accounted for, if one assumes a hierarchical VP structure in which main verbs and their direct objects form constituents. However, the topicalization of a verbal complex "erzählen müßen" in (2) seems to suggest otherwise.

(2) Erzählen müßen wird er seiner Tochter ein Märchen.
tell must will he his daughter a fairy tale
'He will have to tell his daughter a fairy tale.'

Hence multiple structures seem to be needed if one wants to maintain that only single constituents can be fronted and at the same time wants to account for the full range of topicalization data. This introduction of multiple constituent structures is suggested by Pollard (1990) who allows any combination of flat structure and hierarchical structure among verb- complement structures. By Pollard's own admission, the resulting analysis has the undesirable property of introducing spurious ambiguity on a massive scale which is not motivated by independent syntactic or semantic considerations.

We will present an alternative account of topicalization which will be based on two assumptions: 1. main verbs and auxiliaries combine to form complex verbal predicates before NP complements are added (see Hinrichs/Nakazawa 1989 for details), and 2. PVPs are constituents which can appear only in topi-

calized position, as suggested by Nerbonne (1993).

Our analysis will be presented in the version of HPSG outlined in chapter 9 of Pollard/Sag (in press) and will build on their treatment of long-distance dependencies without traces. More specifically, we will account for PVP topicalization by a lexical rule which specifies a verbal constituent as the value of SLASH. This verbal constituent can itself be incomplete in that its SLASH value can be non-empty and can contain material that is missing from the PVP and that is instead realized in non-topicalized position. The same lexical rule can also account for topicalization of saturated VPs since the SLASH-value of slashed verbal constituents can also be instantiated as the empty list.

The resulting analysis avoids a number of crucial shortcomings inherent Nerbonne's analysis: 1. It does not require parochial ID-schemata to generate the PVP constituents in topicalized position. Instead, PVPs can be generated by the independently needed ID schema for other verbal constituents, if the Nonlocal Feature Principle of Pollard/Sag (in press) is changed in ways that have been suggested on independent grounds by Sag (ms). 2. Our lexical rule always applies to the verbal element which governs the PVP. It therefore is local in character, while Nerbonne's lexical rule always applies to the finite verb and therefore needs to be able to refer verbal constituents at an arbitrary level of embedding. 3. Nerbonne has to introduce arbitrary instantiations of the valence feature of auxiliaries as input specification to his lexical rule which lead to incorrect function-argument structures in the semantics.

(The author presents joint work with Tsuneko Nakazawa, NTT Laboratories)

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The Very Idea of Dynamic Semantics

David Israel

"Natural languages are programming languages for minds." Can we or should we take this slogan seriously? If so, how? Can answers be found by looking at the various "dynamic" treatments of natural language developed over the last decade or so, mostly in response to problems associated with donkey anaphora? In Dynamic Logic of Programs, the meaning of a program is a binary relation on the set of states of some abstract machine. This relation is meant to model aspects of the effects of the execution of the program, in particular its input-output behavior. What, if anything, are the dynamic aspects of various proposed dynamic semantics for natural languages supposed to model? Is there anything dynamic to be modeled? If not, what is all the fuss about?
We shall try to answer some, at least, of these questions and provide materials for answers to others.

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Syntax-Semantics Interface:
Where do variables come from and what is to happen to them?

Hans Kamp

Human beings manifest their understanding of what they read or hear largely through their ability to draw inferences from the contents they have grasped. So any theory which counts among its tasks the modelling of this capacity must have something to say about how inferences from such contents can in fact be drawn. If we assume that inference is a formal process (i.e.that it consists in the application of principles which relate the form of the conclusion to the form of the presmisses), then an account of natural language inference must attribute to these premisses a certain semantic or logical form. Virtually all current accounts of formal infernce assume that the forms between which inferences occur share with the predicate calculus the property that they assign a central role to variables, both as means to identify two or more argument positions and to bind such positions. Yet the syntactic evidence for variables as consituents of NL expressions is at best indirect; and in fact most current syntactic theories porpose structures which do not have variables in any literal sense. A theory of the syntax and semantics of a natural language which adopts any combination of syntactic structures and semantic forms which have these resepctive properties will have to say in detail (a) which components of syntactic structure are responsible for the introduction of variables in semantic form and (b) how syntactic (and perhaps other) information determines where and in what way those variables are bound. In this talk I will look at certain natural language mechanisms for "variable management" (i.e. the introduction and binding of variables) and at the part which these mechanisms play in the mapping from syntax to semantics.

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Towards a Typology of Quantificational Constructions

Barbara Partee

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An Hybrid Architecture for the Theory of Focus

Mats Rooth

Contemporary accounts of the grammar of intonational focus are tied together by a semantics for focus: phrases differing in focus structure have different semantic values. Phonetic/phonological realization is characterized by making such semantic values depend on phonological features. Semantic and pragmatic effects of focus – for instance truth conditional association with focus – are accounted for by stating semantic and pragmatic rules in terms of focus-sensitive semantic objects.
I argue that the two most popular and developed versions of this program –

alternative semantics and the structured meaning semantics – are solutions to different parts of the problem. Alternative semantics provides a constrained and explanatory theory of focus sensitive constructions, but the compositional semantics of focus has the combinatorics of lambda binding, as proposed in the structured semantics.

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Intonation and Focus

Mark Steedman

The paper extends the theory of syntax and intonation proposed in earlier work to a wider inventory of categories of discourse meaning, and applies the theory to the grammar of particles like "only", whose semantics has been described in terms of "association with focus". The paper explores the interaction between intonational tunes and the associated discourse functions, and the semantics of these particles.

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Contributed Papers

Parsing second order Lambek grammar in polynomial time

Erik Aarts

No polynomial parsing algorithms for Lambek categorial grammar are known. Although Pentus (1993) proved that the Lambek calculus is contextfree, his construction yields a grammar of exponential size. We give a polynomial algorithm for a weaker system. We can define a constrained system where the types assigned to words in the lexicon have an order of at most two. This means that the arguments of the arguments of a type may not be complex. This fragment has been studied by Buszkowski (who showed that it is context free [Buszkowski, 1990]) and Barry (where this fragment is called D [Barry, 1992]). We give a polynomial algorithm for parsing in this "second order categorial grammar". The algorithm deals with lexical ambiguities (the grammar does not have to be rigid).

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Sequence of tense revisited: two semantic analyses of tense in intensional contexts

Dorit Abusch

This paper analyzes past and present tenses embedded in attitude contexts, focusing on the question whether there is any special interaction between the semantics of attitudes and the semantics of tense. A number of examples can be analyzed in terms of (i) a semantics for tense involving no stipulations specific to intensional contexts, and (ii) a theory of de re interpretation in attitudes. In particular, 'simultaneous' readings of embedded past tenses can be treated as temporal analogues of de se pronouns. However, other data show that tense is sensitive to an intensional context. I propose a semantically oriented sequence of tense analysis where tenses simultaneously constrain local and embedding temporal relations. The absence of 'forward shifted' readings for tense in intensional contexts is attributed to a constraint related to branching futures models of modal/temporal space.

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Craig property of a logic and decomposability of theories

H. Andréka, I. Németi and I. Sain

We investigate the significance of certain famous properties of logical systems (like the Craig Interpolation Property) from the point of view of using that logical system in human (or artificial) reasoning, representation of knowledge, theorem proving etc. The aspect of human reasoning we concentrate on could be called modular reasoning, or hierarchical decomposition of reasoning (a la

Herbert Simon). The point is that we humans do not reason about our environment by using one huge theory, but instead we represent our knowledge in many independent theories (of manageable size) which theories then we use as flexible building blocks when solving a problem or reasoning about something.

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Sophia: halfway between Amsterdam and Budapest

Andrei Arsov[♭] and Maarten Marx[♯]

We combine the languages developed for doing arrow logic in respectively Amsterdam and Sophia and give strongly complete finite Hilbert style axiomatizations with respect to two semantics. In the first semantics models are directed graphs (Budapest style arrow logic models), in the second they are directed multigraphs (Sophia style arrow logic). We also show that the thus obtained logics are decidable and enjoy the strongest Craig Interpolation property.
We note that all these properties fail if one provides this language with the classical (square) semantics (directed graphs with the universal "edge" relation).

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A direct definition of generalized dynamic quantifiers

Martin H. van den Berg

In the last years, a number of authors have tried to find definitions for generalized quantifiers that have a reasonable behaviour in dynamic logic (as defined by Groenendijk and Stokhof). Two flavours occur. Firstly, quantifiers that do not have dynamic effects (Chierchia, van Eijck), but have some internal dynamic properties. Secondly, quantifiers that DO have dynamic effects (my own work and recent work of van der Does). All definitions share that they are fairly ad hoc.
In this paper I will show, that when we reconsider standard (static) generalized quantifiers, we can find a formulation of these, with the usual readings as interpretation, that can be given direct dynamic interpretations.

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Back and forth through time and events

Patrick Blackburn[♭], Claire Gardent[♮] and Maarten de Rijke[♯]

There have been many heated debates on whether points, intervals or events are the appropriate ontology for modeling tense and temporal reference in natural language. In this talk we argue that it is more profitable to *combine* ontologies than to choose between them. To this end we introduce Back and Forth Structures (BAFs) consisting of an event structure linked with an interval structure. We use BAFs to investigate the work of Moens and Steedman on the present

perfect, 'when' and temporal reference, and argue that their work is best viewed in terms of communicating ontologies.

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A data oriented approach to semantics

Rens Bod, Martin van den Berg and Remko Scha

In this paper, we will extend the data oriented parsing approach to take advantage of structures that are enriched with semantic annotations. In data oriented parsing, a manually analyzed language corpus is used as if it were a stochastic grammar. Any subtree from the corpus can function as a structural unit, even if its semantics is not completely specified, provided its semantics can be calculated in the end by employing the principle of compositionality in one of two ways: (1) the meaning is constructed by simple composition of the constituents, or (2) the meaning is derived at by first calculating the semantics of the node directly governing it and then abstracting out the contribution(s) of the sister node(s). We will show, with a number of examples, that this technique is relevant for (1) idioms, (2) anything involving type lifting, and (3) discontinuous constituents.

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Compositionality and coercion in categorial grammar

Paul Buitelaar♭ and Anne-Marie Mineur♯

In this paper we introduce *coercion* in Lambek calculus (Lambek 1961). Coercion in natural language is studied within Generative Lexicon theory (Pustejovsky 1993a, 1993b) and is named after common usage in computer language design for a similar technique (Cardelli and Wegner, 1985). Essential about coercion is that it changes the compositional semantics, while it leaves the syntactic type unaltered. Because of this, a functor may take an argument that does not fit its requirements, in fact $[a/b, c \vdash a]$ can be a valid inference if coercing c into b is allowed. This is very unusual in Categorial Grammar and it would mean that it would have to give up its restricted Fregean view on compositionality. We show how coercion relates to recent proposals on disjunctive categories in sign-based Lambek calculus (Morrill 1992), in the sense that coercion relates disjunctive syntactic types through a shared underlying lexical semantics.

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Tense in simple conditionals

Richard Crouch

This paper deals with deictic shift of English past and present tenses in simple indicative conditionals. This has ramifications both for the semantics of tense and for the semantics of conditionals and modals. A systematic survey of indicative conditionals reveals that the past and present tenses shift asymmetrically. The asymmetry can be accounted for by assigning primary and secondary deictic centres to the tenses. Semantically, the tense system relates an event time to the time at which an update to a hearer's state of information takes place. Update involves adding an assertion to an information state (primary deictic centre) and subsequently verifying the assertion (secondary centre). Applications of the analysis to futurate and habitual uses of the present tense, modals and subjunctive conditionals are also briefly mentioned.

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Sorites and the context-dependence of vague predicates

Kees van Deemter

In this talk, a new, 'linguistic' solution to the sorites paradox of vagueness is proposed. This solution makes crucial use of the assumption that the truth of a vague expression depends on a so-called comparison set that is made up of previously-judged individuals. If this is assumed the crucial, inductive premise of the paradox becomes ambiguous between (1) *im*plausible versions that are strong enough to support the paradox, and (2) plausible versions that are too weak to support the paradox. This shows – predictably – that the paradox is invalid, but it also explains why the paradox may sometimes seem valid.

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The dynamics of sophisticated laziness

Jaap van der Does

This talk is on quantification and anaphora. It presents a system which directly extends the theory of generalized quantification as it developed in the eighties. The idea is to use contextualized versions of the familiar quantifiers and connectives, alon the lines of an E-type analysis (Evans 1977, 1980; Richards 1984; Neale 1990; Heim 1990).
As in all other dynamic systems, one of the main challenges is to find a notion of context which is rich enough to keep track of the dependencies among the anaphoric elements. In my system, as in others, pronouns are quantifiers which depend for their intrpretation on a parameterized context sets. Plural pronouns are interpreted as a universal quantifier over such a context set, while singular pronouns involve a choice from such a set (this is an E-type analogue of ideas underlying DPL (Groenendijk and Stkhof 1991)). All in all a logic results in which strong and weak donkeys, sage plants, cardinals, besides extrasentential anaphora can be dealth with in a principled way.

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On discourse referents, partial models and identity

Jan van Eijck

Identity/non-identity of discourse referents is a partial relation in a partial model. This suggests switching from partial models to a more radical form of partiality, by also partializing the identity predicate. It is claimed that discourse referents are in fact the proto-individuals occurring in proto-models (partial models with a partialized identity predicate). The elementary model theory of proto-models is spelled out and applied to some puzzles of identity.

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Extraction covering extensions of Lambek calculus are not CF

Martin Emms

The Lambek calculus, $\mathrm{L}^{(/,\backslash)}$, seems the most general formulation of bidirectional categorial grammar. It has been shown (Pentus, 93), that $\mathrm{L}^{(/,\backslash)}$-grammars recognise exactly the context-free languages. However, $\mathrm{L}^{(/,\backslash)}$-grammars also undergenerate with respect to extraction constructions (Moortgat, 88). It is of interest then, to ask of the recognising power of extensions of the calculus that allow coverage of extraction. Two extraction covering extensions of $\mathrm{L}^{(/,\backslash)}$ have been proposed in the literature, one using an *extraction connective* (Moortgat, 88), and the other a *permutation modality* (Morrill et al, 90). We first add to this list of extensions, by showing that extraction is also covered by the *polymorphic* extension of $\mathrm{L}^{(/,\backslash)}$, which adds universally quantified category variables (the system, $\mathrm{L}^{(/,\backslash,\forall)}$). A subsystem, $\mathrm{L}^{(/,\backslash,\overline{\forall})}$, effectively allows quantification only over *non-quantified* categories, and we show also to what extent $\mathrm{L}^{(/,\backslash,\overline{\forall})}$ covers extraction. Then the recognising power of these 4 extraction covering extensions of $\mathrm{L}^{(/,\backslash)}$ is considered. It is shown that all 4 allow recognition of non context-free languages.

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Generalized quantifiers as second-order programs — "dynamically" speaking, naturally

Tim Fernando

Generalized quantifiers are analyzed within the so-called 'dynamic' approach to natural language semantics (e.g., Kamp 1981, Groenendijk and Stokhof 1991). Under that approach, the meaning of a sentence is taken to be the set of input/output transitions it induces, according to some translation from first-order formulas to programs typically in (quantified) dynamic logic (e.g., Harel 1984). The concrete problem addressed here is that discourse markers for variables bound by generalized quantifiers must be introduced that can later be used in

a manner consistent with so-called E-type pronouns (Evans 1980). The solution adopted builds heavily on the 'duality' between non-determinism and parallelism considered in Peleg 1987 by interpreting programs as binary relations on non-empty subsets of states from dynamic logic (thereby accomodating the conjunctive branching in and-or computation graphs).

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Individuals and their guises: a property-theoretic analysis

Chris Fox

This talk is concerned with reappraising Landman's formal theory of intensional individuals — individuals under roles, or guises — within property theory (PT). As many of Landman's axioms exist to overcome the strong typing of his representation, casting his ideas in weakly typed PT produces a simpler theory. However, there is the possibility of an even greater simplification: if roles, or guises, are represented with property modifiers then there is no need for Landman's intensional individuals. Landman's argument against the use of property modifiers is re-examined, and shown to rely on a mistaken assumption.

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Progressives, events and states

Sheila Glasbey

We review the treatment of the progressive as a stativiser (Vlach 1981), which has become fairly standard in recent years, in the light of some new observations of ours concerning 'at the time' and 'at the same time'. Concluding that the "stativiser" account is unsatisfactory in some respects, we develop a version of Smith's account (1991) of the progressive, which we express in situation-theoretic DRT (STDRT, Cooper 1993), showing how this improves matters and overcomes some of the problems in Smith's own formalisation in DRT (Kamp and Reyle 1993). However, we point out that our account (like Smith's) does not adequately address the imperfective paradox, and we sketch a treatment using situation-theoretic channels and constraints that appears to offer a solution. We consider too the event/state distinction and the suggestion from several authors that events as opposed to states are spatiotemporally located. We offer new linguistic evidence in support of this proposal and show how this ties in with our account of the progressive described above.

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Sense and reference in dynamic semantics

Daniel Hardt

Dynamic semantics has been restricted to one type of intersentential anaphoric relation: identity of reference between NP's. Two extensions are proposed to

dynamic semantics, using the system of Dynamic Predicate Logic (DPL). The first extension permits anaphoric relations involving VP's. It is shown that a 'Davidsonian' logical form permits anaphoric relations with VP's with only minor changes to the DPL system. The second extension permits identity of sense as well as identity of reference. To permit identity of sense, both for VP's and NP's, the type of variable is raised to be a function of context.

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i-within-i effects in a variable-free semantics and a categorial syntax

Pauline Jacobson

This paper proposes an account of i-within-i effects (as in: "*The/ Every wife(i) of her(i) childhood sweetheart came to the party") within a theory positing a categorial syntax combined with direct model-theoretic interpretation of surface structures. i-within-i effects will be shown to follow immediately from three assumptions, each of which is motivated independently of the problem at hand: (1) there are no variables in the semantics, and the effect of binding a pronoun comes from a semantic type-shift rule as proposed in Jacobson (1992a, 1992b); (2) this rule is coupled with a corresponding syntactic category changing rule operating on syntactic expressions with two (or more) argument slots; (3) common nouns do not contain a (syntactic) argument slot (N is a basic category) and hence relational nouns have only one syntactic slot. The paper will also discuss the interaction of i-within-i effects with Bach-Peters' sentences and with cases which contain no overt pronoun in the complement of a relational noun.

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Synchronous TAG grammars and Montague grammar

Theo M.V. Janssen

In recent papers the notion 'synchronous TAG grammar' is introduced. Two TAG grammars are synchronous if operations are applied simultaneously to related nodes in pairs of trees. As applications of such grammars are proposed: meaning assignment (if one of the grammars is for a logical language), and translation (if the grammars are for different natural languages). It is claimed that synchronous TAG grammars are preferable over traditional methods such as Montague grammar.
The aim of this contribution is to show that the synchronous TAG grammars resemble the framework presented by R. Montague in his Universal Grammar. This observation creates a connection between two theories which were developed independently. The method for meaning assignment in synchronous TAG grammars will be compared with that in Montague grammar. This leads to several suggestions for improvement. Furthermore, the proposals for translation will be compared with those in Rosetta (a translation system based upon Montague grammar).

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Comleteness and decidability of the mixed style of inference with composition

Makoto Kanazawa

A recent 'dynamic' perspective on sentence meanings gives rise to a number of new conceptions of inference, allowing different answers to the question of what it means for conclusion C to follow from premises $P_1, \ldots, P_n$. One such dynamic notion of inference is what van Benthem (1991) calls 'mixed inference', which is closely related to update semantics of Veltman (1991). I present a complete calculus for mixed inference in the case where the language has a connective standing for relational composition, and prove its decidability. I also present a calculus complete for deterministic models, and briefly consider other dynamic styles of inference.

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Syntactic Coding

Marcus Kracht

Modern syntactic theories are difficult to compare because they use tools which are quite different in character, for example *rules* and *filters* or *constraints*. While the latter are static the former are dynamic in character. It is easy to see how a rule based grammar can be reduced to a constraint based grammar, but the converse turns out to be not so straightforward. In this talk I will characterize those constraints which allow a reduction to a rule system. This rule system can be mounted on top of an arbitrary grammar $\mathcal{G}$ and yields a grammar in which the satisfaction of the constraints is taken care of by the rules themselves. This reduction is called *syntactic coding*. Many applications will be given.

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Partiality and Dynamics

Emiel Krahmer

In this talk I want to propose a combination of the partial and the dynamic approaches to natural language semantics in one single framework: a partial version of Groenendijk & Stokhof (1991)'s Dynamic Predicate Logic (which I will call PDPL). PDPL can be used for various reasons, but in this paper the emphasis will be on the phenomenon of presupposition. The basic PDPL will be a conservative combination of a so-called strong Kleene interpretation of the propositional connectives and the standard DPL system. There are however several interesting alternatives. Other interpretations of the propositional connectives can be useful for dealing with presuppositions. And finally it will be

shown that non-conservative combinations can solve certain problems involving negation.

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The weakest modal logic embedding Lambek calculus is undecidable

A. Kurucz, I. Németi, I. Sain and A. Simon

We study a wide variety of logics, related to the "dynamic paradigm" or to Lambek Calculus, or to Pratt's action logics, or to the resource sensitive paradigm. Many of these logics have the connectives "$\circ$", "$/$", "$\backslash$" of Lambek Calculus besides other connectives. (A typical case is when we have all the Booleans together with the three Lambek connectives.) We show a general method for testing whether such a logic is decidable. We will prove that almost all of these logics are undecidable if "$\circ$" is associative. The case when "$\circ$" is commutative will also be investigated. We will find that without associativity of "$\circ$" more logics are on the decidable side, but also some quite innocent looking postulates can cause undecidability. One of these is called the Euclidean Axiom.

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Situated reasoning with temporal anaphora

Alice ter Meulen

A proper account of reasoning with temporal information should model situated inference as a context-dependent relation between events described by narrative text. In the interpretation of a text three different kinds of information are obtained: (1) descriptive, (2) aspectual and (3) perspectival. English examples are presented to illustrate how these three kinds of information can be represented in Dynamic Aspect Trees: (1) descriptive information labels nodes with event-types, (2) aspectual information dynamically controls the flow of information about the described events and (3) perspectival information constrains the relation between the source and currently described event. Particular attention is given to the interaction of stative information (stickers) that does not introduce new nodes, and dynamic information (holes and plugs) that does. Stickers may be portable in certain contexts to other nodes in a DAT, syntactically reflecting the semantic constraints specific to temporal reasoning. Temporal anaphora are represented configurationally in Dynamic Aspect Trees without appealing to reference- times. The notion of 'chronoscope' provides the requisite structure to define the notion of situated temporal inference. The view that aspectual information is of a logical nature is defended against accounts that defer temporal reasoning to an multi-purpose default inference system.

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A semantic approach to strong generative capacity

Philip H. Miller

The classical definition of Strong Generative Capacity (SGC) is shown to be inadequate, and an alternative definition of SGC as the semantic interpretation of linguistic formalism is proposed, allowing the comparison of formalisms using different notations. We interpret structural descriptions in a formalism in terms of models $\langle\langle ID_1, ..., ID_n\rangle, \langle IF_1, ..., IF_n\rangle\rangle$, where the ID_i are intended Interpretation Domains for the formalism and the IF_i are the corresponding Interpretation Functions, which map structural descriptions in the formalism to their interpretation in each ID. Within this framework, we propose IDs for Constituency, Dependency, Endocentricity, Filler-Gap relations, Denotational Semantics, etc., and provide a series of results characterizing and comparing the SGC of different linguistic formalisms (CFG, Marked CFG, X-Bar G, Simple CG, CCG, Dependency G, GPSG, HPSG,TAG, LFG) with respect to these domains.

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Temporal orientation, temporal ordering and tense use in English and French.

Arie Molendijk

Phenomena like the reverse order ('Fred broke his arm: he fell off his bicycle'), the difference between PLUPERF and PRET ('the old man fell to the ground: he slipped/had slipped on . . . '), the possibility of an inceptive reading (in certain contexts) etc. cannot easily be handled within current discourse-oriented theories. The reason is that they don't contain rules stipulating which exactly is the 'orientation point' (OP) for every sentence. OP must be distinguished from R: it often does not correspond to the moment of time to which the discourse 'has taken the recipient', at a given moment of the discourse.

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Order, dependency, connectedness:
parameters of multimodal grammatical inference

Michael Moortgat[♭] and Richard Oehrle[♯]

The paper is a contribution to the study of linguistic inference in the context of a logic of structured resources. We investigate a structural parameter of *connectedness* and its interaction with the parameters of linear precedence, dominance and dependency. The theoretical framework is a *multimodal* logic of categorial type inference — a logic where families of residuated multiplicatives live together. The communication between multiplicatives is implemented via correlation postulates — frame conditions linking the distinct accessibility relations interpreting the multiplicative connectives. Communication through correlation postulates improves on the explicit licensing of structural relaxation in terms of

structural modalities. The multimodal logic is applied to linguistic phenomena of extraposition, adverb placement and 'action at a distance' functors, which are analysed here in terms of head attraction and head adjunction.

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A compositional discourse representation theory

Reinhard Muskens

In the last six or seven years a convergence between different semantic frameworks could be observed. This paper is a contribution to fusing DRT and Montague Grammar. While previous authors have succeeded in obtaining dynamic effects within the latter framework, our synthesis of the two theories is a more evenhanded one in the sense that both DRT and Montague Grammar can be recognised in the result. The logic underlying the fused theory is classical type theory to which three simple first-order axioms are added. It is easily seen that DRT boxes can be interpreted as abbreviations of certain terms in this language and that in fact all the ingredients that are needed for DRT and MG are available. We shall translate a fragment of English into a sublanguage of type theory consisting of (a) boxes, (b) lambdas and application, and (c) the sequencing operator ';' familiar from imperative programming languages. A simple algorithm takes the translations of discourses, boxes, to their truth-conditions, expressed as first-order terms. The approach allows one to transpose specific semantic analyses that were couched in one of the two semantic frameworks to the fused theory and compare or synthesize them there. As an example we generalise the Boolean theory of generalised coordination to make it compatible with data about expressions with anaphoric links across coordinated elements.

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Semantics of nominal Ccomparatives

John Nerbonne

To describe the semantics of complex comparative determiners, we impose a lattice structure (Link's) on the domain, as well as an extensive and Archimedean mapping from the lattice to concrete measures (in N,R+). Comparisons begin as predicates on dimensions or measures; from these we derive classes of predicates on the domain, i.e., generalized determiners (quantifiers). The specification meshes with plural and mass-term logic well and predicts a range of logical properties of comparative determiners, such as conservativity and some monotonicity properties. We examine additive and multiplicative extensions of the framework, and suggest a design for a representation language with derived determiners.

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Syntactic generalizations in compositional grammars

Jan Odijk

It is argued that a compositional grammar must allow 'syntactic transformations', i.e. rules which have identity as meaning operation, to adequately capture syntactic generalizations. A wide variety of phenomena is used to support this point of view. The 'controlled M-grammar formalism' is a compositional grammatical framework which allows such transformations. A consequence of the approach is that the relation between form and meaning becomes relatively indirect, in the following sense: many formal differences between sentences appear to correlate with semantic differences. In the grammar, however, the formal differences have to be accounted for by one set of rules, and the semantic differences by another set. The approach described has been applied to a wide variety of constructions from Dutch, English and Spanish and the resulting analyses have been incorporated in the grammars of the experimental machine translation system Rosetta3, developed at the Philips Research Laboratories.

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Flexible variable-binding and Montague grammar

Peter Pagin and Dag Westerstahl

Nonstandard principles of variable-binding were employed in PFO, a version of predicate logic, making possible a compositional translation, at sentence level, of familiar anaphoric constructions in natural language. Here these principles are extended to an (intensional) type theory (TFO). The binding force of the lambda operator is altered but the semantics is still essentially the same as in standard Intensional Logic.
TFO is straightforwardly applied to yield a version of Montague Grammar. This provides a simple way of handling donkey anaphora etc. within the Montagovian framework, with compositionality also at the subsentential level.
The combination of donkey anaphora and psychological contexts adds new varieties of so-called intentional identity, apparently making a rather strong case for an ontology of thought objects.

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The mereo-topology of event dtructures

Fabio Pianesi and Achille C. Varzi

We hold that combining a mereological approach with a topological perspective provides a resourceful framework for the formal-ontological analysis of natural language semantics. In this spirit we present a general setting–using as primitives the relation of overlapping and the operation of topological closure–which is meant to apply uniformly to as diverse domains as space, time, and the common-sense world. In particular, we focus on event-related phenomena and show how the temporal dimension can be reconstructed from the basic

primitives. Illustrative examples include a revisitation of the Aristotle-Kenny-Vendler-Dowty classification and a discussion of the distinction between progressive and habituals.

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Equality in labelled deductive systems and the functional interpretation of propositional equality

Ruy J.G.B. de Queiroz[♭♯] and Dov M. Gabbay[♭]

Within the context of natural deduction for Labelled Deductive Systems, we formulate what appears to be a middle ground solution to the 'intensional' vs. 'extensional' dichotomy which permeates the approaches to characterising propositional equality (as in P. Martin-Löf's type theories). The intensional aspect is dealt with in the functional calculus on the labels, whereas the extensionality is kept to the logical calculus on the formulas. Equalities which are dependent on the deduction/computation path (context) are handled by the functional calculus on the labels. Those equalities are usually definitional, and may come from the 'geometry' of deduction (e.g. β, η, ζ), and thus carry essentially 'intensional' information. On the other hand, equality in the logical calculus (propositional equality) is essentially 'extensional' as it refers to the 'existence' of a way of rewriting a referent into another one. We look at propositional equality ($\doteq$) as a 'Skolem-type' connective (such as disjunction and existential quantification), where notions like 'dependent variables' and 'choice' play a crucial role. This means that in the elimination rule for $\doteq$ we need to introduce identifiers (new symbols) for compositions of equalities denoting arbitrary rewriting paths. We believe this provides a new perspective on the connections Gentzen–Herbrand (i.e. the 'sharpened Hauptsatz').

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Anaphoric presuppositions and zero anaphora

Kjell Johan Sæbø

I propose a solution to the problem of zero argument anaphora, or definite ellipsis. Since (Shopen 1973) it has been known that many missing arguments have a definite interpretation, but it has not been known how this interpretation comes about. My hypothesis is that the relevant verbs trigger presuppositions involving the arguments. On an anaphoric account of presuppositions as in (van der Sandt 1992) or (Kamp & Rossdeutscher 1992), it can be shown that the zero arguments get an anaphoric interpretation through the presuppositions. The analysis depends on the assumption that the Discourse Representation Structure for the presupposition is proper, so that the discourse referents for the zero arguments are in the presupposition's universe and must be anchored to discourse referents in the context.

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Polarity and the flow of time

Victor Sanchez Valencia, Ton van der Wouden and Frans Zwarts

The purpose of this talk is to draw attention to the semantical properties of temporal connectives such as before and after. In particular, we shall raise the question whether the observed restrictions on the occurrence of negative polarity items in before-clauses can be described in terms of the semantic structure of the connective. In order to provide an answer, we adopt the treatment proposed by Anscombe and Landman. More specifically, we show that before is not only monotone decreasing, but has the characteristic properties of a so-called anti-additive expression as well. This result will enable us to point out an unexpected connection between the phenomenon of negative polarity and ontological assumptions about the flow of time. For it is shown that the behavior of before can only be explained if the model of time underlying natural language is not a branching, but a linear one. We end the talk by discussing two other interesting properties of the account: before and after are not converses and before is non-veridical in that it doesn't force us to accept the truth of the clause it introduces.

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Consequentiality, subevents and temporal relations: the cases of *when* and *then*

Görel Sandström

I argue that perceived temporal relations between events in discourse depend on relations of a non-temporal kind between these events. There are two such non- temporal relations, consequentiality and subevent. I propose that an account of the interpretation of event sentences needs to distinguish between two subrelations of consequentiality, with different logical properties, namely causation/response and enablement. Causation/response, like the subevent relation, is a direct relation between event referents; enablement, in contrast, relates two events via the result state of the first. I show that these distinctions account for different acceptability conditions on two devices for imposing temporal relations on events, 'when'-clauses and 'then'.

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An algebraic appreciation of Venn diagrams

Jerry Seligman

We propose an account of the semantics of Venn diagrams which is parallel to, but quite distinct from, the usual Frege-Montague semantics for languages. Unambiguous linear notations can be, and often are, viewed abstractly as having the syntax of terms and a matching algebraic semantics. For diagrams,

we propose a topological semantics to match their topologically invariant syntactic structure. The connection between the two approaches is provided by Stone's well-known theorem relating Boolean algebras to Boolean spaces. We use Stone's theorem to provide a completeness proof for a system of deduction using Venn diagrams.

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Natural language, generalized quantifiers and modal logic

Dorit Ben-Shalom

This paper defines $ML(Q)$, *the modal logic determined by the type* $< 1, 1 >$ *quantifier* Q, and uses it to investigate systematic connections between natural language, generalized quantifiers and modal logic. It is shown that natural language quantifiers are characterized by invariance under isomorphisms and generated submodels, which are special types of bisimulations, whereas standard modal logic is characterized by invariance under *all* bisimulations, and on finite models, being determined by invariance under bisimulations.

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Definite and indefinite generic NPs

Henriëtte de Swart

In this paper I will be concerned with the analysis of generic and non-generic interpretations of definite and indefinite NPs in generic sentences which express a characteristic predication. I will base my analysis on an interpretation of indefinite NPs as dynamic existential quantifiers (cf. Groenendijk and Stokhof 1992). I will specify certain pragmatic constraints on the relation between individuals and events, which allow me to explain generic readings as the effect of quasi-binding by the adverbial operator, along with the event variable. In this way we can dispense with type shifting operations in the semantics, and preserve a uniform analysis of adverbs of quantification as generalized quantifiers over events. An interpretation of definite NPs as context-dependent quantifiers allows us to extend the analysis to Romance languages, in which genericity is often expressed by means of definite NPs.

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Quantifiers in Pair-list Questions: Restrictions and Consequences

Anna Szabolcsi

The paper examines what quantifiers support pair-list questions and uses the observations to argue that (i) matrix and complement wh-questions do not belong to one uniform type, and (ii) quantification into questions is both necessary and harmless in the complement case. – Ad (i), it is shown that matrix choice questions (pair-list readings with indefinites or disjunctive questions) do no

exist. Apparent examples involve cumulative readings. Thus matrix questions need never be interpreted as generalized quantifiers. This is reserved for the complement position, the natural habitat of GQs. – Ad (ii), the standard domain restriction treatment is in terms of 'there is a witness set of QP such that ...' Since not only increasing but also non-monotonic quantifiers support complement pair-list questions, a maximality condition is needed. Once it is added, the result is essentially quantificational, which has independent advantages.

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BABY-SIT: A computational medium based on situations

Erkan Tın and Varol Akman

There have been various computational approaches to situation theory. However, questions of what it means to do computation with situations and what aspects of the theory makes this suitable as a novel programming paradigm have not been fully answered in the literature. Encouraged by two recent proposals, PROSIT and ASTL, we are developing a computational environment, BABY-SIT, which incorporates the essential ontological features of situation theory. Situations are viewed at an abstract level and are modeled as sets of parametric infons, but they may be non-well-founded. A prototype for BABY-SIT is currently being developed in KEE^{TM} (Knowledge Engineering Environment) on a SPARCstation^{TM}. This interactive environment will help one to develop and test his program, observe its behavior vis-a-vis extra (or missing) information, make inference, and issue queries.

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Accenting phenomena, association with focus, and the recursiveness of focus-ground

Enric Vallduví and Ron Zacharski

Recent work in formal semantics argues that the interpretation of a number of logico-semantic operators is crucially defined in function of the traditional focus-ground partition. For this proposal to hold, one needs to assume that sentences with more than one of these operators contain multiple focus-ground partitions in an overlapping or recursive fashion. This paper shows that such an assumption is unwarranted. A careful analysis of the English facts and a contrastive look at languages that realize focus-ground syntactically, like Catalan, reveals that not all accented constituents are foci in a focus-ground partition but that operators can nevertheless associate with them. The fact that so-called focus-sensitive operators operate on partitions that are not focus-ground invalidates any accounts that crucially define the semantics of these operators in terms of the semantics of focus-ground.

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Tree models and labelled categorial grammar

Yde Venema

Where language models form the standard interpretation for the associative Lambek Calculus, finite-tree models (free groupoids) are a natural semantics for the non- associative system NL. However, NL is not complete for this interpretation, and despite the apparant simplicity of tree structures, it seems to be hard to find a finite sound and complete axiomatization.

In the talk we will give a few examples of unintuitive sequents that are valid. We will argue why a labelled calculus might behave better, and make two proposals for such Labelled Categorial Grammars; both systems allowing cut-elimination. Soundness and completeness are proved for interpretations that are 'almost' the intended one, namely for tree models where all resp. some trees may be infinite. We will conclude the talk with some more general remarks concerning the logical problems involved with use of labelled systems in Categorial Grammar.

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