# ROY DYCKHOFF WAS A RARE NONCONFORMIST

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Bath

Journeys in Computational Logic: Tributes to Roy Dyckhoff – London, 3 September 2019

Talk available from my home page and at <a href="http://cs.bath.ac.uk/ag/t/RDWARNC.pdf">http://cs.bath.ac.uk/ag/t/RDWARNC.pdf</a>

# PAPER SUBMISSION TO JACM - DECEMBER 1999

First submission of my paper A System of Interaction and Structure, over which deep inference is based.

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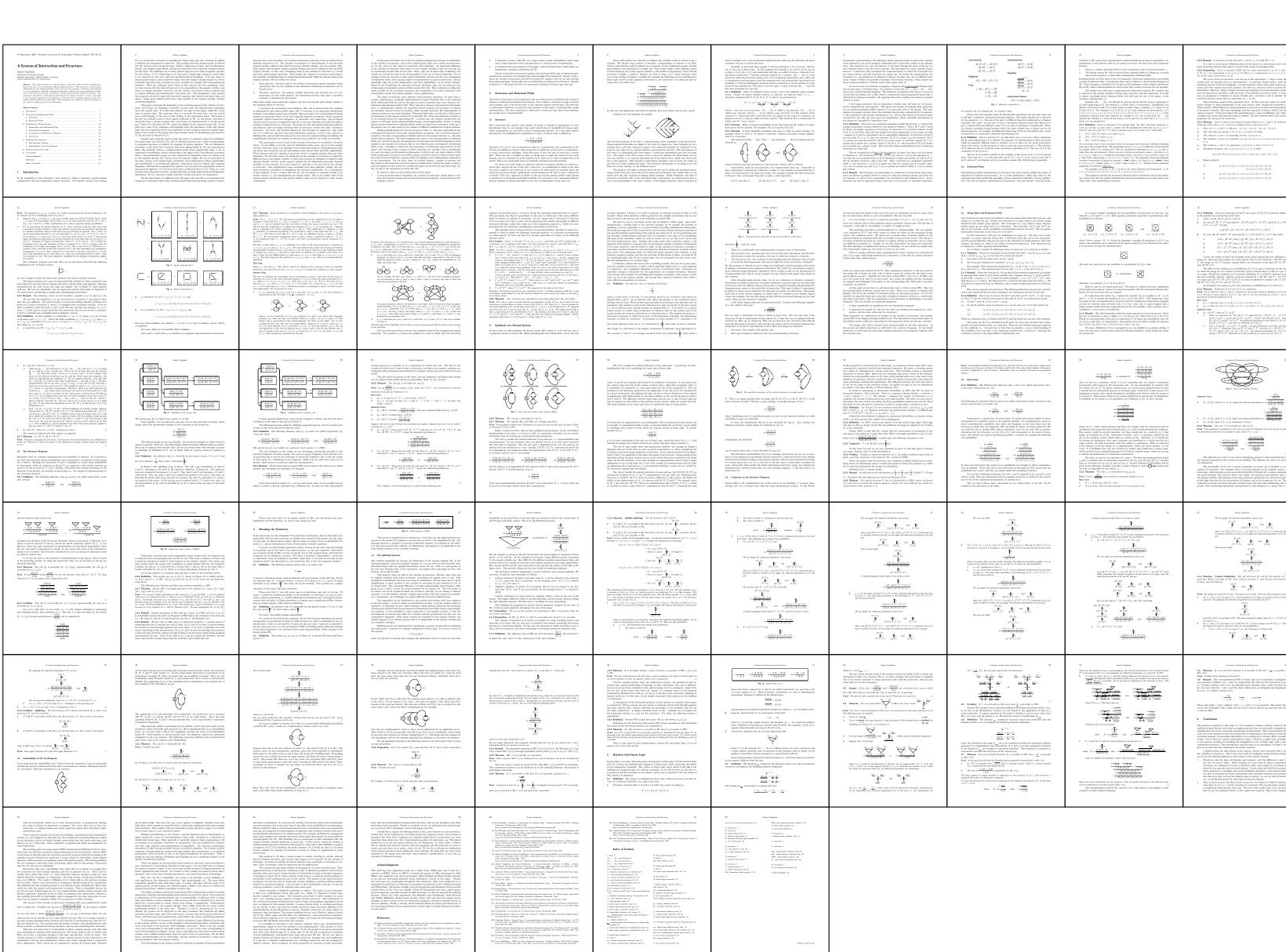
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### PAPER SUBMISSION TO ACM TOCL - SEPTEMBER 2002

Resubmission with modest changes.

62 technical pages of eccentric ideas.

Five years of work without publishing anything – for the dominating neo-liberalism my measure was zero and I should have perished but ...



### REVIEW BY ROY - OCTOBER 2003

Resubmission.

Result: accepted. First sentence in Roy's in-depth review:

This is an interesting and unusual paper, which I recommend be accepted following attention to my comments below—they are lengthy, but it is a lengthy paper.

This is an interesting and unusual paper, which I recommend be	line \$-9; replace "Except" by "As well as".	Paragraph 3, "which observe negation"what does that mean?	Negation not only obeys the usual De Morgan laws; it
accepted following attention to my comments belowthey are lengthy, but it is a lengthy paper. The author introduces a new formalism,	Four lines on, you use "then" where the natural English word is "So". [This mistake occurs many times.]	Do you mean 'take account of negation'?  "due to" => "owing to".	There is confusion (see above) between whether negati primitive or defined notion; the latter seems prefera should be no primitive notion of the negation of a st
called the 'calculus of structures', and for certain formal systems therein	Page 3	Line \$-1: I agree that the C of S allows to express new logical	Thus, \$\overbar{a}\$ is a negative atom but ***not***
proves obviously desirable results analogous to cut-admissibility in sequent calculus.	Line 3 maybe the work of Tait should also be mentioned. Line 5 replace "translating in" by "translating into". Line 7 replace 'fundamentally different concepts than in' by 'concepts fundamentally different from those in'	systems, but does it allow the expression of new proof-theoretical properties,	What does "parentheses can be equivalently eliminated English usage is that there are many kinds of 'bracke 1. Round brackets, ( and ), also called 'parenthes
A semantic notion 'called 'relational field' is used to motivate the development of the primitive rules of the calculi.	by 'concepts fundamentally different from those in'  "different than" should be "different from", so far as correct	or is it just that it has them? ", allowing the expression of new logical systems,	<ol> <li>Round brackets, (and), also called 'parenthes</li> <li>Square brackets, [and], often called plain 'b</li> <li>Curly brackets, { and }, also called 'braces',</li> </ol>
The exposition is flavoured with terminology suggestive of atomic	English is concerned.	and having new proof-theoretical properties," would rephrase it along the lines I think are intended. Note the extra comma in my version.	4. Angle brackets, { and }, also called 'braces', 5. Double angle brackets, « and », also called 'XX
physics, which helps understanding without falling into the trap of overdoing the analogy.	American English usage differs from British English usage; the etymology is from Latin, where (the translation of) 'from' is the appropriate preposition. Perhaps Americans would say that	Page 5	<ol> <li>6</li> <li>When you refer to elimination of 'parentheses', you m</li> </ol>
The motivation is an extension of multiplicative linear logic with a	they differ than' British in this context, but I doubt it.  The US usage is, I guess, a combination of 'different from' and 'other than'; the phrase 'anders alsh' is the commonest expression	You could add to the list of achievements of the paper that there are some non-trivial results (Context Reduction, Splitting)	elimination not just of parentheses but of all kinds of brackets.
simple non-commutative but self-dual operator, 'seq'; I am not an expert on the	'other than'; the phrase 'anders als' is the commonest expression for both in German), and many US settlers were German	Despite the suggestion on this page, I have not found the graph representation of structures helpful to my understanding.	the round brackets are called 'parentheses'. This confusion occurs below several times.
possible applications of such an idea, but consider the paper to be (conditionally) acceptable regardless of its applicability.	The bad expression occurs many times	Page 7 Line 6: what does "relations induced by a context" mean?	[It is unfortunate that parentheses were not chosen f connective:
On balance the exposition is of a high standard; many of the points below are	Description of the idea of 'top-down symmetry' isn't clear. In fact, a clear explanation of what you mean by "top-down" would	Maybe this is the place to mention seq structures informally.	the alliteration would have helped us remember which is which
just detailed quibbles or suggestions for improved English. The proofs are clear and well-structured, with one exception detailed below.	help, since it means one of two contrary things, but one often cannot tell which.	2.1.1 I commend the practice, not here observed, of using LaTeX's facility to add after the word Definition the names of concepts being defined.	logical connective; but now, alas, it is surely too l  Definition 2.4; what is this defining?
If the Journal's space allowance requires the paper to be	The phrases "root-first" and "leaf-first" may be useful in this context.	At least you have the terms emphasised; but you can do better!	[Useful convention made easy by LaTeX; say on the fir bold,
abbreviated, then the material on relational fields could be removed to another paper with no	Emphasise the word "structure" where you say that it is "an expression intermediate".; roughly, this is where it is	<pre>If \$a\$ is an atom, and \$\overbar{a}\$ its negation, is that a     negative atom?     (You are muddling the grammar)</pre>	what is being defined.] Is the notion of "a/the normal form of a structure" d [You need it to define flatness.]
significant effect on the other main results.	defined.	What are "Structures with a hole"? The notion should be defined	If one normal form of a structure contains no seq str all?
Comments to the author	Next line; what is "a normal logical formula"? Do you mean "an ordinary"?	carefully.  In the final sentence, "\$\$\{\}\$ is its context".	[Yes; just state the result.]  Since 'proper seq' is a noun phrase, you need the wor
Page 1	What is a "root connective"? Some special kind of connective, or a connective at a special place?	In the final sentence, "SS\{\}\$ is its context".  Say " the context of \$R\$ therein\$, to emphasise  (a) that it is the context of \$R\$ rather than of \$S\{R\}\$ and	several times in the penultimate sentence of the defi e.g. say that \$\$\{ \}\$ is a {\em proper seq context}
Abstract Insert 'therein' after 'achieved'. Replace 'submitted to' by 'subject to', and 'allow' by 'allowing'.	Last paragraph, line 5; insert "to" in "than [to] any other".	(b) that it is the context of SRS in a particular thing, not just the context of SRS in general.	" where then flat." => " so, are flat".
	Two lines on: "different than in" => "different from that in".  Line \$-2, what are 'simple atoms"? Are they just 'atoms"?	In 2.1.2, "stand" => "stands".  Figure 8 appears many pages later; at least say where!	Give an argument for [o, <a;b>] not being a proper par Some sort of theorem saying that if one normal form l so do others.</a;b>
Page 2 line 11; what are the ''deep reasons for pomset-like logics		Higure 8 appears many pages later; at least say where! Better still, some simple illustrations here of the notation would be helpful.	
not to be expressible in the sequent calculus? Citing [25] is not enough, unless BV is shown equivalent to pomset logic.	Page 4  "Relational fields": a poor name for this important concept.	Page 8	Page 9  2.1.6 Definition; are atom occurrences not dependent
			representation,
i.e. on the representative of the equivalence class? Surely they are; in fact, "occurrence" needs much more careful definition.	Page 12	whether as the possibility of interaction or otherwise.  The sensitivity of structural relations to negation is not something	In the [co]merge rule[s], is \$R \merge T\$ the merge s (in which case I don't understand the rule) or just some arbitrary member thereof?
Are they positions in a tree? I think not. What ARE they? Note again the	Definition 2.2.6	The sensitivity of structural relations to negation is not something on which I, lacking knowledge of their feelings, can agree.	
problem about whether $\sigma_a$ is a negative atom or the negation of an atom.	Atom occurrences are only defined in the context of a structure.	Delete "to" in "the laws to which Q must obey".	Page 24  If 5 is derivable for {1,8} and 7 is derivable for {1
	Page 16	What does it mean for a structure Q to 'respect all the structural relations'?	and 1 is derivable for {1,8} and / is derivable for {1 and 1 is derivable for {5,7,8,9}, why does it follow that 1 is derivable for {8,9}?
Page 10	"sort of a" => "approximately a"	Page 19	
Line 6 "while manipulating"; the grammar of this suggests that there is a	Page 17	Comma after "replace \$g\downarrow\$' should be a colon.	Page 30
<pre>time at which a conservation property manipulates relational fields</pre>	3.1 Definition of inference rule; are T and R just structures or do they also contain variables which	"The corresponding of" ???	'amount of interactions' => 'number of interactions' 'cooling down a structure'; put 'cooling' in quotes!
Line 7 What is a 'sort of a semantics'? (Anyway, you mean, rather, 'a sort of semantics'.)	can be replaced by structures when the rule is instantiated?  "Denoted with" => "Denoted by" (here and many times below)	Last paragraph; the 'structure fragment' is a fragment of what, and is this phrase a new one (in which case explain it)?	3.3.1 Omit the first sentence of the definition.
'at the exception' => 'with the exception'.	The notion of 'topmost structure in a derivation' is always,	Similarly for the 'interaction fragment'.	"prevents the validity of " => 'disallows"
The stuff in the paragraph 'Consider' looks like a definition of S\domarrow as a binary relation. If it is a definition, say so. Is it the distinctness of SR_is and SR_js that matters,	according to the normal meaning of 'topmost', defined; but you have a different usage in mind,	Page 20	3.3.2 "requested" => 'required'; or say 'without \$
or that \$i\$ and \$j\$ are distinct?	according to which a proof has no 'topmost' structure, since it begins	Explain the ideas about interaction more carefully.	3.3.5 "it holds $T < R$ " $\Rightarrow$ " $T < R$ holds".
<pre>2.2.1 Definition Is the containment relation \$\subset\$ proper?</pre>	with an inference without a premiss. You need to define the notions of length and premiss etc of derivation rather as follows:	"cannot neither X nor Y" should be "can neither X nor Y" or (equivalently) "cannot either X or Y".	But, '<' is undefined.
'they hold' => 'the following hold'. (twice)	A {\em derivation of length \$0\$} consists of a single structure;	(Double negation is not to be used as an emphatic form of negation!)	Page 31
Show that the relational field associated to a structure is independent	<pre>its {\em premiss} and {\em conclusion} are that structure. A {\em derivation of length \$n &gt; 0\$} consists of a chain of</pre>	3.1.1 it is the atom occurrences of R that have to be in Q, not just the atoms of R.	The finiteness argument at the top of the page is one like to
of the choice of normal form.	<pre>\$n\$ inference, the conclusion of each being the premiss of the next; if the first inference has a premiss, then that is the {\em</pre>	Is this notion of immersion not just the standard notion of being a substructure?	see more detail; but perhaps that should be in the ne proof search.
Page 11	<pre>premiss}     of the derivation; if the last inference has a conclusion, then</pre>	3.1.3 The notion of 'cover' seems to be defined here; emphasise it!	Page 33
<pre>Line 2-3; I am not clear (from reading these two lines) what this claim about atoms in a substructure (substructure of what?) says;</pre>	that is the {\em conclusion} of the derivation		The "derivability of cut" for a system containing ato one peculiarity here is that you can show (I think) d
e.g. if a and b are such atoms, and aRb, then bRb, so R is reflexive.		Page 21	not just admissibility. Maybe this deserves mention.
which fits ill with the definition  The proposition makes it clearer, once one reflects that b and c are	Page 18  See previous comments about 'top-down' and 'bottom-up'. These two	Can you give us an intuitive understanding of why the merge operator is non-associative? The example shows it, but does not help my understanding.	Page 36
The proposition makes it clearer, once one reflects that baild care the 'atoms in a substructure' and 'a' is an 'atom surrounding them'. But it would be even clearer as "given two atom occurrences a and b	views are also the 'synthetic' and 'analytic' viewpoint respectively (see		Line 6, what is 'matter'?
But it would be even clearer as "given two atom occurrences a and b in R and an atom occurrence c in S{}, aRc iff bRc, for each of R =".	the Helsinki thesis by Petri Maenpaa).  I don't yet have an understanding of the idea of communication,	Page 23	4.1 In definition of a 'proof', omit first occ 'rule'.
Line S-S, is this discussion of matter helpful?	As stated, the Context Reduction Theorem and its proof are strange. Moreover, the version that was in your mind when you used it to prove 4.1.6 Corollary	Page 46	5.4, case 4 Separate the two subcases.
Page 37	(Splitting) was a bit different; as things stand, your proof f 4.1.6 is faulty,	I don't see the problem in your argument, other than its informality.	Page 53
At this point, it would be helpful to present some simple results about derivability in BV, e.g. (I use horizontal arrows for convenience)	because it needs a stronger version of 4.1.5 than is stated. However, a weaker version of 4.1.6 is easily proved, and that is all	Give a hint.	Give a reference for the 'known' properties of MLL+mi
* if one has proofs of R and of T, then one can construct one of <r;t>, and  * each of (R,T) =&gt; <r;t> and <r;t> =&gt; [R,T] is derivable.</r;t></r;t></r;t>	that, I think, you subsequently use.	Page 47 Nice that the admissibility argument gets rid of had inferences	Page 54  Transformed in => Transformed into.
These and similar ideas are used without comment in some of the	A strengthened version of 4.1.5 would say  Definition Let \$5\{ \}\$ be a context and U a structure.	Nice that the admissibility argument gets rid of bad inferences in each step rather than just replacing them by similar inferences of lower rank!	Transformed in => Transformed into.
proofs below.	Definition Let SS\{ \}S be a context and U a structure. Then, U {\emptyre m represents} SS\{ \}S iff  (i) for all X one can derive [X II] are SXX		Page 55  differences with respect to => differences from (see
Page 39	(i) for all X, one can derive [X,U] ==> S{X} (ii) the inference rule	Page 48 Give the proof of 4.2.2	
Mention in mid-proof, twice, of the 'lemma' is confusing. Which lemma?	S{R}  [R,U]	Page 49	Is there not still the notion of 'main connective' if normal forms?
The cases in the proof need better numbering, e.g. there is a reference	is admissible.	In the penultimate line, the tall proof should be displayed for	Page 56
to Case 1.1 but that numbering on the case is only implicit!	Theorem Every context is representable.	legibility.	"our analogous" => "our analogues"
Reference to use of 4.1.2 should be made where used, e.g. in "is trivially proved [by 4.1.2]".	In other words, it is like your theorem, except that my U is independent of R and the provability of S{R}.	Page 50	define 'beautiful' => call 'beautiful'.
The proof style "Given X, consider Y" is a bit terse; say where the new terms in Y come from, e.g. 'by applying the inductive hypothesis to the proof of the premiss".	I haven't a proof of this (over to you), but if it works it should be similar to the proof of 4.1.5, maybe with some admissibility lemmas on the way	Again, expand a bit on the finiteness argument.  Most, but not all, cut-free sequent systems have the subformula	Page 58
by applying the inductive hypothesis to the proof of the premiss .	(as in more conventional proof theory). If it is not provable, then how about a discussion and a counterexample?	most, but not all, cut-free sequent systems have the subformula property; see [26] for an example, C4ip.  What do you mean by 'connectives that **split** formulae'?	settle down => resolve
"The following cases exhaust the possibilities"; insert "other" after "the".	Now you see what I mean by a stronger theorem, note that this is what you used in your proof of 4.1.6. You can avoid this by restating	What is the 'energy' of a formula?	
	4.1.6 by moving "there exists S1 and S2" into the two cases.	Page 51	
Make the case "A similar argument into a separate subcase. Ditto on next page.	The strangeness of the proof of 4.1.5 is (e.g. in case 1)	Where is the relation '=' on formulae 'defined above'?	
Make the case "A similar argument into a separate subcase. Ditto on next page.  I have stared long and hard at the last inference on this page:	the omission of 'we can find U' but the appearance of "[R,U] is		
Make the case "A similar argument into a separate subcase. Ditto on next page.  I have stared long and hard at the last inference on this page: WHY is it an instance of Sq\downS? I believe you, but some explanation will help the reader.	the omission of 'we can find U' but the appearance of "[R,U] is provable"	I regret the misuse of turnstile " -" to construct sequents from multisets of formulae; it is unnecessary, and Frege's original usage degraded.	
Make the case "A similar argument into a separate subcase. Ditto on next page.  I have stared long and hard at the last inference on this page: WHY is it an instance of Sq\down5?  I believe you, but some explanation will help the reader. Perhaps the same applies to a similar step on page 42.	the omission of 'we can find U' but the appearance of "[R,U] is	multisets of formulae; it is unnecessary, and Frege's original usage degraded.	
Make the case "A similar argument into a separate subcase. Ditto on next page.  I have stared long and hard at the last inference on this page: WHY is it an instance of Sq\downS? I believe you, but some explanation will help the reader.	the omission of 'we can find U' but the appearance of "[R,U] is provable"  (Note your use (in case 1) of a rule that if A and B can be proved. So can -ARBS:	multisets of formulae; it is unnecessary, and Frege's original usage degraded.	

#### REVIEW BY ROY - OCTOBER 2003

Resubmission.

Result: accepted. First sentence in Roy's in-depth review:
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accepted following attention to my comments belowthey are lengthy, but it is a lengthy paper. The author introduces a new formalism,	Four lines on, you use "then" where the natural English word is "So". [This mistake occurs many times.]	Do you mean 'take account of negation'?  "due to" => "owing to".	There is confusion (see above) between whether negation is primitive or defined notion; the latter seems preferable, should be no primitive notion of the negation of a structu
the 'calculus of structures', and for certain formal systems therein	Page 3	Line \$-1: I agree that the C of S allows to express new logical	Thus, \$\overbar{a}\$ is a negative atom but ***not*** a neg
<pre>proves obviously desirable results analogous to cut-admissibility in sequent calculus.</pre>	Line 3 maybe the work of Tait should also be mentioned. Line 5 replace "translating in" by "translating into". Line 7 replace 'fundamentally different concepts than in' by 'concepts fundamentally different from those in'	systems, but does it allow the expression of new proof-theoretical properties.	What does "parentheses can be equivalently eliminated" mea English usage is that there are many kinds of 'brackets':
A semantic notion 'called 'relational field' is used to motivate the development		or is it just that it has them?	<ol> <li>Round brackets, ( and ), also called 'parentheses'.</li> <li>Square brackets, [ and ], often called plain 'bracke</li> </ol>
of the primitive rules of the calculi.  The exposition is flavoured with terminology suggestive of atomic	"different than" should be "different from", so far as correct English is concerned.	and having new proof-theoretical properties," would rephrase it along the lines I think are intended. Note the extra comma in my version.	<ol> <li>Curly brackets, { and }, also called 'braces',</li> <li>Angle brackets, &lt; and &gt;,</li> <li>Double angle brackets, « and », also called 'XXXXXX',</li> </ol>
physics, which helps understanding without falling into the trap of overdoing	American English usage differs from British English usage; the etymology is from Latin, where (the translation of) 'from'		6
the analogy.	is the appropriate preposition. Perhaps Americans would say that they 'differ than' British in this context, but I doubt it.	Page 5 You could add to the list of achievements of the paper that there	When you refer to elimination of 'parentheses', you mean telimination
The motivation is an extension of multiplicative linear logic with a simple non-commutative but self-dual operator, 'seq'; I am not an expert on	The US usage is, I guess, a combination of 'different from' and  'other than'; the phrase 'anders als' is the commonest expression  for both in German), and many US settlers were German	are some non-trivial results (Context Reduction, Splitting)  Despite the suggestion on this page, I have not found the graph	not just of parentheses but of all kinds of brackets. Prop the round brackets are called 'parentheses'.
the possible applications of such an idea, but consider the paper to be (conditionally) acceptable regardless of its applicability.	The bad expression occurs many times	representation of structures helpful to my understanding.	This confusion occurs below several times.
(conditionally) acceptable regardless of its applicability.  On balance the exposition is of a high standard; many of the points	Description of the idea of 'top-down symmetry' isn't clear.	Page 7 Line 6: what does "relations induced by a context" mean? Maybe this is the place to mention seq structures informally.	[It is unfortunate that parentheses were not chosen for th connective; the alliteration would have helped us remember which sort
below are just detailed quibbles or suggestions for improved English. The	In fact, a clear explanation of what you mean by "top-down" would help,	2.1.1 I commend the practice, not here observed, of using LaTeX's	is which logical connective; but now, alas, it is surely too late!]
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If the Journal's space allowance requires the paper to be abbreviated, then the	context.	If \$a\$ is an atom, and \$\overbar{a}\$ its negation, is that a	bold, what is being defined.] Is the notion of "a/the normal form of a structure" define
material on relational fields could be removed to another paper with no significant effect on the other main results.	Emphasise the word "structure" where you say that it is "an expression intermediate".; roughly, this is where it is defined.	negative atom? (You are muddling the grammar)	Is the notion of "a/the normal form of a structure" define [You need it to define flatness.]  If one normal form of a structure contains no seq structur
	Next line; what is "a normal logical formula"?	What are "Structures with a hole"? The notion should be defined carefully.	all? [Yes; just state the result.]
Comments to the author Page 1	Do you mean "an ordinary"?  What is a "root connective"?	In the final sentence, "\$S\{\}\$ is its context". Say " the context of \$R\$ therein\$, to emphasise	Since 'proper seq' is a noun phrase, you need the word 'co several times in the penultimate sentence of the definitio
Abstract	Some special kind of connective, or a connective at a special place?	(a) that it is the context of \$R\$ rather than of \$S\{R\}\$ and (b) that it is the context of \$R\$ in a particular thing,	e.g. say that \$S\{ \}\$ is a {\em proper seq context}
Insert 'therein' after 'achieved'. Replace 'submitted to' by 'subject to', and 'allow' by 'allowing'.	Last paragraph, line 5; insert "to" in "than [to] any other".	not just the context of \$R\$ in general.	" where then flat." => " so, are flat".
	Two lines on: "different than in" => "different from that in".  Line S-2, what are 'simple atoms"? Are they just 'atoms"?	In 2.1.2, "stand" => "stands".  Figure 8 appears many pages later; at least say where!	Give an argument for [o, <a;b>] not being a proper par or c Some sort of theorem saying that if one normal form looks so do others.</a;b>
Page 2 line 11; what are the ''deep reasons for pomset-like logics		Better still, some simple illustrations here of the notation would be helpful.	
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i.e. on the representative of the equivalence class? Surely they are; in fact, "occurrence" needs much more careful definition.	Page 12	whether as the possibility of interaction or otherwise.  The sensitivity of structural relations to negation is not something	In the [co]merge rule[s], is \$R \merge T\$ the merge set it (in which case I don't understand the rule) or just some arbitrary member thereof?
Are they positions in a tree? I think not. What ARE they? Note again the problem about whether \$\overbar{a}\$ is a negative atom or the	Definition 2.2.6 Atom occurrences are only defined in the context of a structure.	on which I, lacking knowledge of their feelings, can agree.	Page 24
problem about whether \$\overbar{a}\$ is a negative atom or the negation of an atom.		Delete "to" in "the laws to which Q must obey".	If 5 is derivable for {1,8} and 7 is derivable for {1,9},
	Page 16	What does it mean for a structure Q to 'respect all the structural relations'?	and 1 is derivable for $\{5,7,8,9\}$ , why does it follow that 1 is derivable for $\{8,9\}$ ?
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time at which a conservation property manipulates relational fields	3.1 Definition of inference rule; are T and R just structures or do they also contain variables which	"The corresponding of" ???	'amount of interactions' => 'number of interactions'  'cooling down a structure'; put 'cooling' in quotes!
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'at the exception' $\Rightarrow$ 'with the exception'.	"Denoted with" => "Denoted by" (here and many times below)  The notion of 'topmost structure in a derivation' is always,	phrase a new one (in which case explain it)? Similarly for the 'interaction fragment'.	"prevents the validity of " => 'disallows"
The stuff in the paragraph 'Consider' looks like a definition of \$\downarrow\$ as a binary relation. If it is a definition, say so.	according to the normal meaning of 'topmost', defined:	Page 20	3.3.2 "requested" => 'required'; or say 'without \$m_2\$'
Is it the distinctness of \$R_i\$ and \$R_j\$ that matters, or that \$i\$ and \$j\$ are distinct?	but you have a different usage in mind, according to which a proof has no 'topmost' structure, since it	Explain the ideas about interaction more carefully.	
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Is the containment relation \$\subset\$ proper?	of length and premiss etc of derivation rather as follows:	<pre>(equivalently)   "cannot either X or Y". (Double negation is not to be used as an emphatic form of negation!)</pre>	
'they hold' => 'the following hold'. (twice)  Show that the relational field associated to a structure is	A {\em derivation of length \$0\$} consists of a single structure; its {\em premiss} and {\em conclusion} are that structure.	3.1.1 it is the atom occurrences of R that have to be in Q, not just the atoms of R.	Page 31  The finiteness argument at the top of the page is one wher
Show that the relational field associated to a structure is independent of the choice of normal form.	A ${\ensuremath{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\mbox{\m}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}$	Is this notion of immersion not just the standard notion	like to see more detail; but perhaps that should be in the next pa
Page 11	<pre>next;    if the first inference has a premiss, then that is the {\empremiss} premiss}</pre>	of being a substructure?  3.1.3 The notion of 'cover' seems to be defined here; emphasise	proof search.
Page II  Line 2-3; I am not clear (from reading these two lines)	premnss; of the derivation; if the last inference has a conclusion, then that is	3.1.3 The notion of 'cover' seems to be defined here; emphasise it!	Page 33
what this claim about atoms in a substructure (substructure of what?) says;	the {\em conclusion} of the derivation		The "derivability of cut" for a system containing atomic c one peculiarity here is that you can show (I think) deriva
e.g. if a and b are such atoms, and aRb, then bRb, so R is reflexive,	010	Page 21	not just admissibility. Maybe this deserves mention.
which fits ill with the definition  The proposition makes it clearer, once one reflects that b and c are	Page 18  See previous comments about 'top-down' and 'bottom-up'. These two	Can you give us an intuitive understanding of why the merge operator is non-associative? The example shows it, but does not help my understanding.	Page 36
the 'atoms in a substructure' and 'a' is an 'atom surrounding them'. But it would be even clearer as "given two atom occurrences a and b	views are also the 'synthetic' and 'analytic' viewpoint respectively		Line 6, what is 'matter'?
But it would be even clearer as "given two atom occurrences $a$ and $b$ in $R$ and an atom occurrence $c$ in $S\{\}$ , aRc iff bRc, for each of $R=\dots$ ".	the Helsinki thesis by Petri Maenpaa).  I don't yet have an understanding of the idea of communication,	Page 23	4.1 In definition of a 'proof', omit first occurren 'rule'.
Line \$-5, is this discussion of matter helpful?	As stated, the Context Reduction Theorem and its proof are strange.		5.4, case 4
	Moreover, the version that was in your mind when you used it to prove 4.1.6 Corollary	Page 46	Separate the two subcases.
Page 37  At this point, it would be helpful to present some simple results	(Splitting) was a bit different; as things stand, your proof f 4.1.6 is faulty, because	I don't see the problem in your argument, other than its informality. Give a hint.	Page 53
about derivability in BV, e.g. (I use horizontal arrows for convenience)	it needs a stronger version of 4.1.5 than is stated. However, a weaker version of 4.1.6 is easily proved, and that is all		Give a reference for the 'known' properties of MLL+mix.
if one has proofs of R and of T, then one can construct one of <r;t>, and each of (R,T) =&gt; <r;t> and <r;t> =&gt; [R,T] is derivable.</r;t></r;t></r;t>	that, I think, you subsequently use.  A strengthened version of 4.1.5 would say	Page 47	Page 54
* each of $(R,T) \Rightarrow \langle R;T \rangle$ and $\langle R;T \rangle \Rightarrow [R,T]$ is derivable. These and similar ideas are used without comment in some of the		Nice that the admissibility argument gets rid of bad inferences in each step rather than just replacing them by similar inferences of lower rank!	Transformed in => Transformed into.
proofs below.	Definition Let SS\{ \}S be a context and U a structure. Then, U {\emptyre merpresents} SS\{ \}S iff		Page 55
Page 39	<ul><li>(i) for all X, one can derive [X,U] ==&gt; S{X}</li><li>(ii) the inference rule</li></ul>	Page 48 Give the proof of 4.2.2	differences with respect to => differences from (see also
Mention in mid-proof, twice, of the 'lemma' is confusing. Which	S{R}		Is there not still the notion of 'main connective' if we l normal forms?
lemma? The cases in the proof need better numbering, e.g. there is a	[R,U] is admissible.	Page 49	
reference to Case 1.1 but that numbering on the case is only implicit!	Theorem Every context is representable.	In the penultimate line, the tall proof should be displayed for legibility.	Page 56 "our analogous" => "our analogues"
	In other words, it is like your theorem, except that my U is independent of R and the provability of $S\{R\}$ .	Page 50	define 'beautiful' => call 'beautiful'.
Reference to use of 4.1.2 should be made where used, e.g. in "is trivially proved [by 4.1.2]".	I haven't a proof of this (over to you), but if it works it should	Again, expand a bit on the finiteness argument.	Page 58
e.g. in "is trivially proved [by 4.1.2]".  The proof style "Given X. consider Y" is a bit terse:		Most, but not all, cut-free sequent systems have the subformula property;	rage 58 settle down => resolve
e.g. in "is trivially proved [by 4.1.2]".	be similar to 1.1.5, maybe with some admissibility lemmas on the way (as in more conventional proof theory). If it is not provable, then	proper cy,	
e.g. in "is trivially proved [by 4.1.2]".  The proof style "Given X, consider Y" is a bit terse; say where the new terms in Y come from, e.g.  'by applying the inductive hypothesis to the proof of the premiss".	be similar to the proof of 4.1.5, maybe with some admissibility lemmas on the way	see [26] for an example, G4ip.	
e.g. in "is trivially proved [by 4.1.2]".  The proof style "Given X, consider Y" is a bit terse; say where the new terms in Y come from, e.g. "by applying the inductive hypothesis to the proof of the premiss".  Page 40  "The following cases exhaust the possibilities"; insert "other"	be similar to the proof of 4.1.5, maybe with some admissibility lemmas on the way (as in more conventional proof theory). If it is not provable, then how about a discussion and a counterexample?  Now you see what I mean by a stronger theorem, note that this is what	see [26] for an example, C4ip.  What do you mean by 'connectives that **split** formulae'?  What is the 'energy' of a formula?	
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We met about ten times on professional occasions and we exchanged about three hundred emails.

He helped me when my job was insecure.

He helped my students with technical feedback and recommendation letters.

I am sure he reviewed several of our other papers.

Until the end, he encouraged our research on deep inference.

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Until the end, he encouraged our research on deep inference.

But, most importantly,

without Roy's accurate and bold review deep inference (and I) would not exist.

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Any researcher can do this.

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Only a nonconformist does this.

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I am sure he reviewed several of our other papers.

Until the end, he encouraged our research on deep inference.

But, most importantly,

without Roy's accurate and bold review deep inference (and I) would not exist.

Note: Roy encouraged the **method** (**taking risks** by pursuing eccentric ideas) – not necessarily the ideas themselves (maybe deep inference will turn out to be a bad idea after all).

#### WHAT I LEARNED FROM ROY

It is possible to resist neo-liberalism and be a happy researcher.

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Nonconformists like Roy are rare and therefore precious – at the very least they keep hope alive.

Those are important pieces of information that helped me survive and that I try to transfer to all my students.