

Changing Legal Systems: Abrogation and Annulment

Part II: Temporalised Defeasible Logic

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NICTA and CIRSFD

15 July 2008



Australian Government
Department of Broadband, Communications
and the Digital Economy
Australian Research Council

NICTA Members



Department of State and
Regional Development



The University of Sydney



Queensland
Government



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- Provision in force from January 1

If the taxable income of a person is in excess of 100,000\$, then the top marginal rate computed at February 28 is 50% of the total taxable income.

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- Provision in force from February 15

If the taxable income of a person is in excess of 120,000\$, then the top marginal rate computed at February 28 is 30% of the total taxable income.

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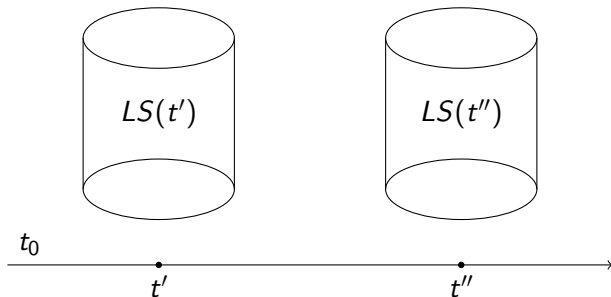
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- Italian solution: Don't pay taxes!
- US solution: Lend money!

$LS(t_1), LS(t_2), \dots, LS(t_j), \dots$



- Derive (plausible) conclusions with the minimum amount of information.
 - Definite conclusions
 - Defeasible conclusions
- Defeasible Theory
 - Facts
 - Strict rules ($A \rightarrow B$)
 - Defeasible rules ($A \Rightarrow B$)
 - Defeaters ($A \rightsquigarrow B$)
 - Superiority relation over rules
- Conclusions
 - 1 $+\Delta q$, which means that q is strictly provable in D ;
 - 2 $-\Delta q$, which means that q is not strictly provable in D ;
 - 3 $+\partial q$, which means that q is defeasibly provable in D ;
 - 4 $-\partial q$, which means that q is not defeasibly provable in D .

A rule is identified by a unique label and gives conditions to derive a (legal) provision at a particular time.

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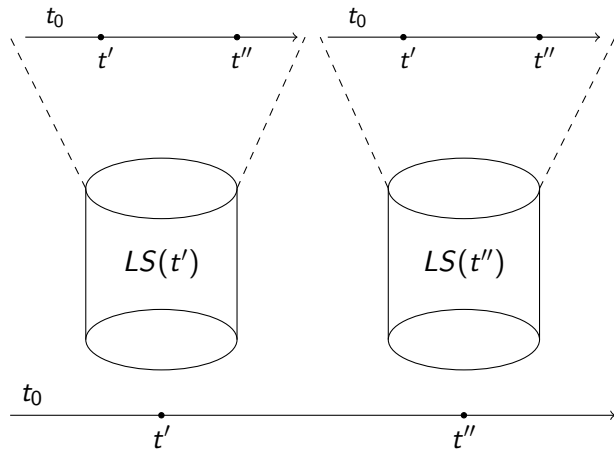
$$r1 : (IncomeThreshold^{31Jan} \Rightarrow HighMarginalRate^{(28Feb, \tau)})(1Jan, \pi) @ (31Dec, \pi)$$
$$r2 : (HighMarginalRate^{28Feb} \Rightarrow Pay50\%^{(1March, \pi)})(1Jan, \pi) @ (31Dec, \pi)$$

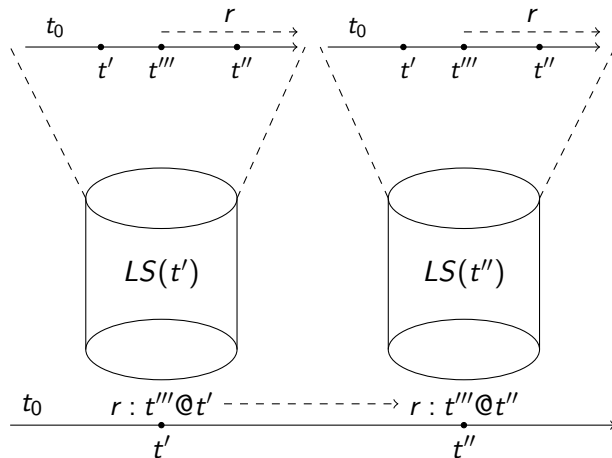
A meta-rule gives conditions to establish that a rule is effective (and when it is), with respect to a particular time.

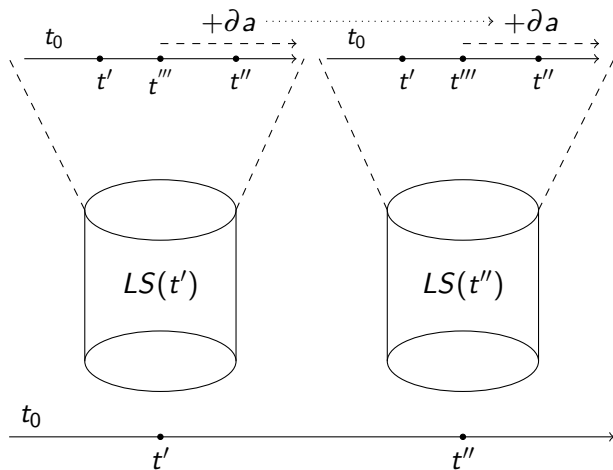
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$mr : (JoinEU^{21March} \Rightarrow$

$r1 : (IncomeThreshold^{31Jan} \Rightarrow HighMarginalRate^{(28Feb, \tau)}(1Jan, \pi)) @ (1Jan, \pi)$







Persistence in Normative Systems



Given

$$r1 : (a^{10} \Rightarrow b^{(20,\pi)}(5,?)@v1$$

When can we prove b ?

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- 1 Can we prove b^{20} from viewpoint 4?

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$$r1 : (a^{10} \Rightarrow b^{(20,\pi)})(5,?)@v1$$

When can we prove b ?

- 1 Can we prove b^{20} from viewpoint 4? No
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Given

$$r1 : (a^{10} \Rightarrow b^{(20,\pi)})^{(5,?)@v1}$$

When can we prove b ?

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- 1 Can we prove b^{20} from viewpoint 4? No
- 2 Can we prove b^{20} from viewpoint 5? Yes
- 3 Can we prove b^{25} from viewpoint 5? Yes
- 4 Can we prove b^{20} from viewpoint 10?

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- 2 Can we prove b^{20} from viewpoint 5? Yes
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- 5 What about if $r1$ ceases to be effective at 9? Can we still prove b^{20} from viewpoint 10, and prove it from viewpoint 5?

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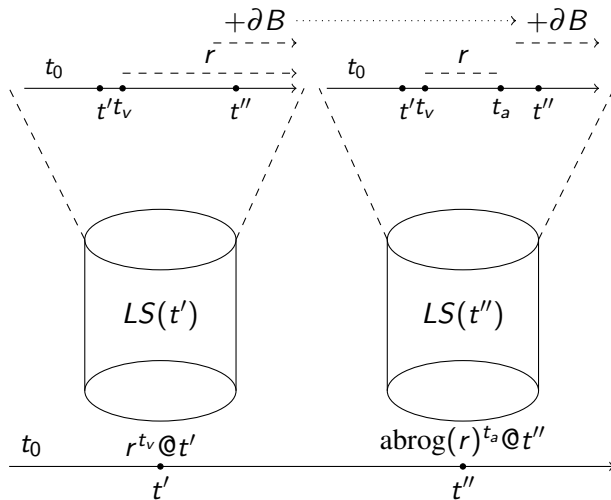
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- 5 What about if $r1$ ceases to be effective at 9? Can we still prove b^{20} from viewpoint 10, and prove it from viewpoint 5? ???
- 6 Can we prove b^{20} from viewpoint 5 in a successive version of the normative system ($v2$)? and what about if $v2$ no longer contains $r1$?

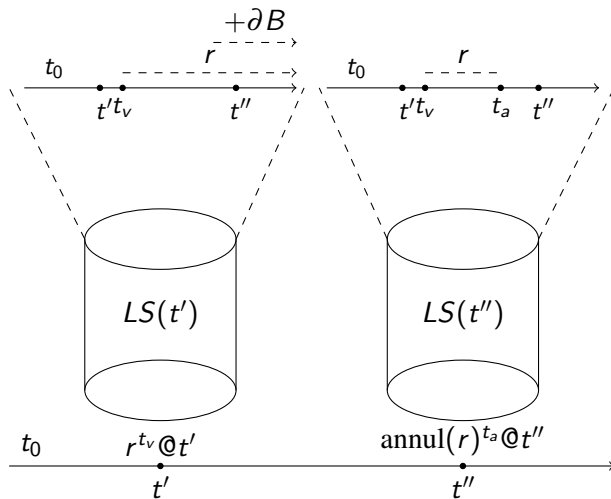
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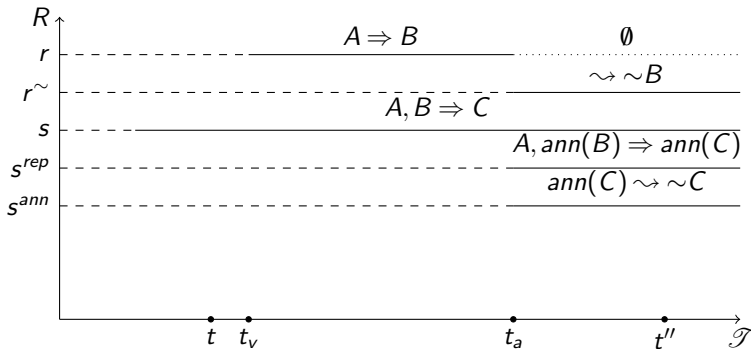
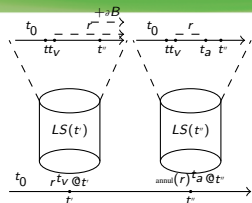
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- Logical model to capture modifications in normative systems.
- It handles retroactivity, time-forking.
- Model a larger corpus of norm-modifications
- Experiment with other temporal models (intervals, duration, periodicity), and causality.
- Study of the complexity and other logical properties.