

# Modelling Legal Relations

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# Abstract

We use propositional dynamic logic and ideas about propositional control from the agency literature to construct a simple model of how legal relations interact with actions that change the world, and with actions that change the legal relations.

Our conceptual model allows us to study the interplay of obligation, knowledge, and ignorance, and to model knowledge based obligation.

(this is joint work with Fengkui Ju, Beijing Normal University, Beijing, China)

# The Law is About Relations between People Regarding Actions



Wesley Newcomb Hohfeld, 1879–1918

American jurist, famous for *Fundamental Legal Conceptions*  
[Hoh13, Hoh20]

# Jural Opposites and Jural Correlatives

## Jural Opposites (Related by Negation)

- ▶ Right versus No-right (or: Claim versus No-claim)
- ▶ Privilege versus Duty (or: Liberty versus Duty)
- ▶ Power versus Disability
- ▶ Immunity versus Liability

## Jural Correlatives (Related by Swap of Agent Role):

- ▶ Right versus Duty
- ▶ Privilege versus No-right
- ▶ Power versus Liability
- ▶ Immunity versus Disability



# Square of Opposition for Legal Powers

I have *power* to  
claim X against you

You are *liable* to my  
claim X against you

You are *immune* to  
my claim X against you

I am *unable* to  
claim X against you

## Example Case: Legal Exchange

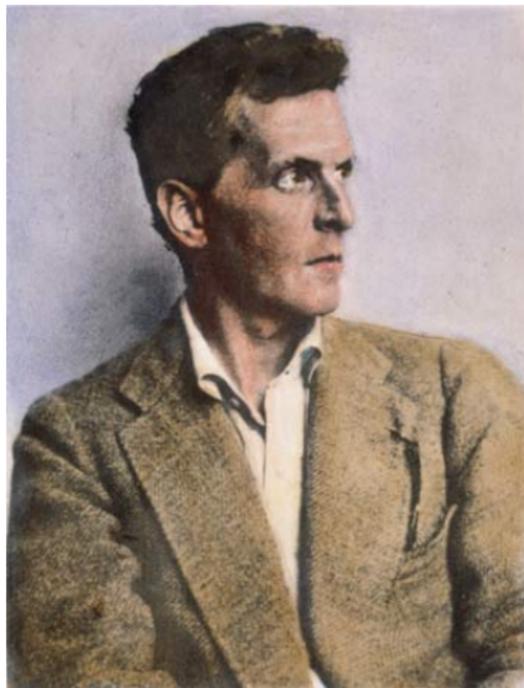


- ▶ Jan asks for car rental at `https://www.drivy.com`
- ▶ Car owner accepts rental request.
- ▶ Owner has the *legal power* to do this.
- ▶ Jan estimates distance; rental amount is calculated,
- ▶ Jan ticks box 'no extra insurance' (liability of €800).
- ▶ Form is submitted, amount is charged from credit card.
- ▶ Jan has rented a car ...

# Action and Forbearance

- ▶ forbear = politely or patiently restrain an impulse to do something; refrain.
- ▶ *To act*: to change certain basic facts of the world by one's power of agency.
- ▶ *To forbear*: to restrain an impulse to prevent an agent from changing certain basic facts of the world within the power of that agent.
- ▶ Programme: interpret *to act* and *to forbear* in the simplest possible way,
- ▶ ... Incorporate these interpretations in a formal system, investigate the expressive power and properties of the system.

# Philosophical Simplification



“Die Welt ist die Gesamtheit der Tatsachen, nicht der Dinge.”

# What is a Basic Action?

Change a basic proposition from true to false or vice versa:

$$p := \top$$

$$p := \perp$$

Actions are performed by agents. We assume that each agent has agentive power over a subset of the set of all basic proposition letters. Also, they can change facts in parallel:

$$(a, Q)$$

It is assumed that  $a$  has agentive power over the  $q \in Q$ . If  $q$  is true, it is made false, and vice versa.

# What is To Forbear?

- ▶ For  $a$  to forbear acting on  $p$  is *not to act* on  $p$ , while having the *ability* to act.
- ▶ Consistency of system of claims: no *conflict of duties*

$C_{ba}^+(Q) \cap C_{ca}^-(Q) = \emptyset$  for all  $Q \subseteq P$ , and for all agents  $a, b, c$ .

# What do we have?

- ▶ DynaLex: sound system for reasoning about claims concerning action and forbearance.
- ▶ Completeness: in the works
- ▶ DynaLex also deals with *changes in legal powers*.
- ▶ ... and with informative actions.
- ▶ ... allows formal definitions of obligation, permission, acceptability, knowledge based obligation.

## References



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