On the Formal Analysis of Normative Conflicts

Abdullatif A.O. Elhag, Joost A.P.J. Breuker and Bob W. Brouwer

University of Amsterdam, The Netherlands
{elhaga, breuker} @lri.jur.uva.nl
brouwer@jur.uva.nl

Abstract

The study of the formal attributes of legal systems such as consistency, completeness, independence and generality is of special interest in legal philosophy and legal theory. Apart from concern with the content of the law, these formal attributes constitute desiderata without which a legal system is considered deficient. Legisprudence is a relatively new discipline within legal theory that studies these formal (and other) attributes of law at the level of law making (i.e. legislation). This trend in legal theory is also paralleled by research in the so-called field of legimatics, which focuses generally on the use of informatics in the process of drafting legislation. One approach within legimatics studies the limits and constraints of applying AI techniques and methods to the law making process (e.g. JURIX 1993) as well as application of these techniques to certain tasks within this process (JURIX 1993; Valente 1995; Den Haan 1996). This paper discusses normative conflicts, their explication and typology, and relates these to the conceptualization of legal knowledge and methods for representing it. In particular, we discuss some common approaches in legal theory for the explication of normative conflicts and show their limitations. In particular, we argue that these common approaches do not pay sufficient attention to the role 'world knowledge' plays in the analysis of normative conflicts. Finally, we suggest alternative ways for dealing with the problems that arise from inconsistency in law. The observations we make are relevant for the development of computer programs designed to assist in the law-making process.

1 The problem of normative conflicts

Normative conflict or inconsistency in law[1] is broadly defined as the provision by the legal system of incompatible solutions to the same individual

1 There is a plethora of terms used to refer to the phenomenon of inconsistency in law notwithstanding the conceptual differences underlying these terms. Normative inconsistencies, normative conflicts, antinomies, discordance etc. are among these terms. In this paper we do not attempt to offer a full account of the conceptual differences underlying these terms but will make reference to them when →

Abdullatif A.O. Elhag, Joost A.P.J. Breuker and Bob W. Brouwer, 'On the Formal Analysis of Normative Conflicts', in: H.Jaap van den Herik et al. (eds), *Legal Knowledge Based Systems, JURIX 1999, The Twelfth Conference*, Nijmegen: GNI, 1999, p. 35-46.

(real or hypothetical) case. Legal norms address individual behaviour in the world by means of reference to patterns of behaviour that may or may not be satisfied. This pattern of behaviour includes reference to classes of agents, objects, acts, etc. Accordingly, an instance of behaviour in the world performed by a certain agent at a certain time is called 'individual case', and the general pattern of this behaviour as specified in the norm is called 'generic case' (GC) (Valente 1995). Thus, generic and individual cases are distinguished by the fact that the latter is a performance by a certain agent at a certain time of some behaviour to which the generic case refers in general. Accordingly, a set "S" of legal norms is said to be inconsistent if there is among the norms belonging to S a norm *x* with a generic case GC*x*, and another norm *y* with a generic case GC*y*, and GC*x* ↔ GC*y*, and the deontic qualification of GC*x* is incompatible with that of GC*y*. This is the crudest characterisation of normative conflicts, but in the discussion we present more types.

It is to be noted, however, that normative conflicts are not the only type of inconsistency that may arise in law. Besides norms (between which normative conflicts may occur), the law also contains other types of rules, e.g. rules that define concepts used in law, and it is conceivable that inconsistency may also arise between rules of this type.

According to us, such types of conflicts are distinguished by the type of legal knowledge to which they belong. As in Breuker & Den Haan (1991), Valente (1995), Den Haan (1996), we distinguish between 'normative knowledge' and 'world knowledge'. Normative knowledge refers to legal norms, i.e. legal rules that specify a certain behaviour as obligatory, permitted or prohibited in certain conditions. Its function is to set standards guiding individual behaviour. This type of legal knowledge is considered to be the most characteristic of law to the extent that some legal philosophers reduce all types of legal knowledge exclusively to normative knowledge.

World knowledge, in contrast, is descriptive and not prescriptive. It contains abstract description of the world to which normative knowledge is intended to apply. This type of knowledge is not normally made explicit in law but can be obtained through the analysis of legislation. An important component of world knowledge is the definitional or terminological one which contains definitions of concepts used in the law.

In the following section (2) we present varieties of conceptions of normative conflicts from the legal theory literature.

2 Conceptions of normative conflicts

2.1 The Impossibility-of-joint-compliance test

One trend of conceptualizing normative inconsistency in law is restricted to conflicts arising between imperative norms only i.e. norms enjoining or prohibiting certain behaviour. The Impossibility-of-joint-compliance test (IJC-test for short) clearly shows this trend[2].

According to the IJC-test 'compliance statements' are formed in order to discern conflict between norms. A compliance statement describes a state of

appropriate. The terms normative inconsistencies and normative conflicts are used interchangeably in this paper.

2 For a detailed discussion of the IJC-test, see Hart (1970), see also Hill (1987).

affairs that corresponds to the content of the norm. For example, the compliance statements for the norms O(*p*) (obligatory '*p*') and O(~*p*) (obligatory 'not-*p*') are 'p is done'; and 'p is not done', respectively. Where the compliance statements are contradictory as the previous two, so also are the norms to which they correspond and these are thus considered to be conflicting.

The IJC-test and the concept of conflict that follows from it suffer certain weaknesses (Hill, 1987).

First: Because permissive norms are not susceptible for constructing compliance statements the IJC-test restricts conflicts only to cases involving imperative norms. As a consequence of this, permissive norms are excluded from consideration in determining the consistency of law.

Second: the IJC-test completely disregards modalities other than the deontic ones. For example, rules pertaining to normative powers (Hart's secondary rules, Hart 1994) are not considered by this test. This type of rules, it has been suggested, is capable of producing conflicts in two ways: a) they may conflict with deontic norms, and b) they may conflict with each other. Approaches that attempted to remedy this type of shortcoming could be found in Hohfeld (1919), Kanger (1972), Lindah (1977), and Hill (1997). We agree with these approaches that normative knowledge involves more concepts than obligation, prohibition and permission and that those other concepts have to be analysed and presented in a formal theory. Furthermore, we believe that more attention should be given to world knowledge than it has hitherto received.

2.2 A general characterisation of norm conflict

In his book *Law and Justice,* Ross (1958) has identified three ways in which inconsistency in law arises: 'total-total', 'total-partial' and 'intersection'.

2.2.1 Total-total inconsistency

The first is what he calls "total-total inconsistency" which is characterised by the fact that neither of a pair of norms is applicable without conflicting with the other. In terms of the notion of generic case (GC) introduced earlier this characterisation means that the two norms share identical generic cases. This could be schematically represented as follows:

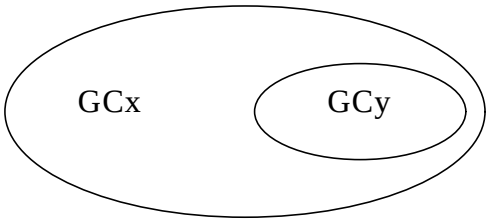


Figure 1 Implication of relation between GCx and GCy

This characterization is, however, somewhat ambiguous as there may be several types of conflict assumed under it, which arise for different reasons. The distinction proposed by Lindahl (1992) (discussed below) make this point more clearer.

Figure 1 above represents two sets of (hypothetical) cases in which **(a)** it is not possible to apply one norm without applying the other, i.e. each occa-

sion for the application of one norm is also an occasion for the application of the other; and, **(b)** the impossibility of the simultaneous application of the norms.

(a) means that the two norms share identical application-grounds, that is, other things being equal, the norms relate to the same subject, act or behaviour prescribed and conditions of application.

(b) the reasons for the impossibility of realizing the norms relates to incompatibility of the deontic operators. This incompatibility as shown above arises in two ways: **(i)** contradictory deontic operators e.g. prohibition versus a permission, or, **(ii)** contrary deontic modalities, i.e. a prohibition versus an obligation. It is to be noted that in the latter instance of contrary deontic modalities there would be a negation of the act.

2.2.2 Total-partial inconsistency

The second is total-partial inconsistency which the author characterises as that between a pair of norms one of which cannot be applied in any case without coming into conflict with the other, while the latter does not conflict in all cases of its application with the former. Schematically, this could be represented as follows:

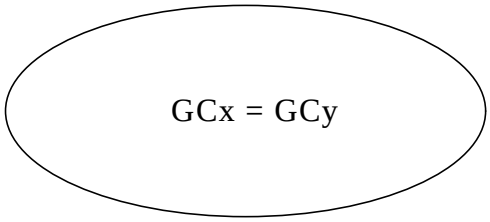


Figure 2 Identical generic cases

The implication relation between generic cases plays an important role in the characterization of exceptions in law. Winkels et al. (1998) give a definition of exceptions based on implication relation between generic cases.

2.2.3 Intersection

The third situation according to Ross' characterisation is of a pair of norms each of which having cases within the sphere of it application in which it applies without conflict with the other, but also cases in which it conflicts with the other norm.

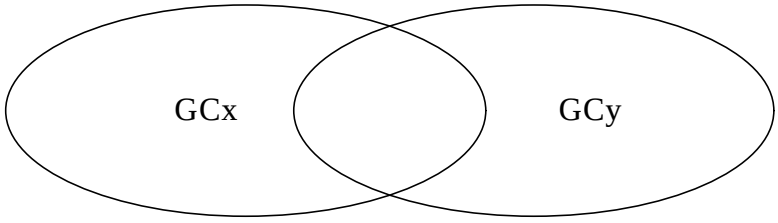


Figure 3 Intersecting generic cases

2.3 The unrealizability thesis

The unrealizability thesis (Lindahl, 1992) is based on two rather intuitive conditions:

i that the norms belonging to a set of norms S must be individually realizable.
ii that the norms in S are not jointly realizable.

The first condition stipulates that what a norm prescribes should not be impossible to conform to, which means that the norm content should not be something that happens or does not happen by itself. This refers to the nature of the (generic) acts prescribed.

The second condition means that what is prescribed by a set of norms cannot be performed simultaneously. Accordingly, while it is possible to conform to each member of S individually it is not possible to realize all of these members simultaneously. We illustrate these conditions with an example and then discuss the typology of normative conflict according to the unrealizability thesis.

Example: if we take the generic act 'overtaking', we can have the following three norms:

N1: "it is permitted to overtake".
N2: "it is prohibited to overtake".
N3: "it is obligatory to overtake".

In this example, **N1** and **N2** conflict because of the incompatibility (i.e. contradictory relation) between the permission and prohibition (i.e. Fp v. Pp; or O –p v. ~O–p). Thus, while **N1** and **N2** could be individually realizable, the set S1 = {**N1, N2**}is unrealizable.

The norms **N2** and **N3** conflict because of the incompatibility (i.e. contrary relation) between the prohibition and the obligation (i.e. Fp v. Op, or Op v. O –p). Similarly, **N2** and **N3** could be individually realizable while the set S2 = {**N2, N3**} is unrealizable.

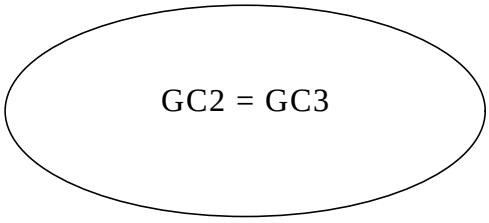
It is to be noted, however, that there is no conflict between **N1** and **N3** as an obligation implies a permission, i.e. O(p) → P(p), or O(p) –O → (–p). Thus the set of norms S3= {**N1, N3**} may be considered as containing a redundancy.

2.3.1 Disaffirmation conflicts

A disaffirmation conflict (Lindahl 1993) is due to the incompatibility between the deontic operators of the norms involved. Thus, by definition disaffirmation conflicts involve norms with different deontic operators, i.e. O(*p*) disaffirms P(~*p*), and F(*p*) disaffirms P(*p*).

2.3.2 Compliance conflicts

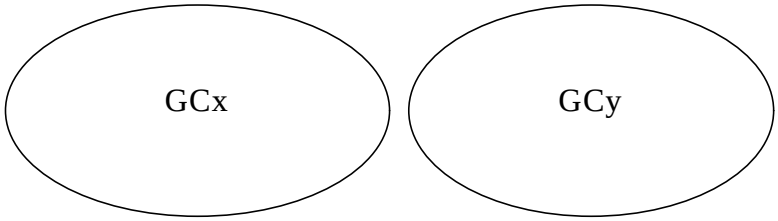
These are defined over deontic operators of the imperative character. A representation for the generic cases (GCs) of **N2** and **N3** above would be the



following:

Figure 4: Identical generic cases

Another variety of compliance conflict involves exhaustive and mutually



exclusive GCs as in the following example and representation.

Example:
N4: "it is obligatory to overtake-right"
N5: "it is obligatory to overtake-left"

Figure 5 Exhaustive and mutually exclusive generic cases
(where the union of the generic cases exhausts the universe of discourse)

Compliance conflicts not only arise in case where the generic cases refer to exhaustive and mutually exclusive sub-types of a generic act, but also to generic cases involving a generic act and its negation such as:

N3: "it is obligatory to overtake"
N6: "it is obligatory not-to-overtake"

(The latter norm, i.e. **N6**, could be rephrased into a prohibition, which renders it of the same representation as in Figure 4 above.)

3 Normative inconsistency

The accounts of normative conflicts discussed above are related to the notion of normative inconsistency. Normative consistency as a model for elucidating conflicts in law is based on the logical relations between deontic operators as depicted in (or in a variant of) the following deontic square:

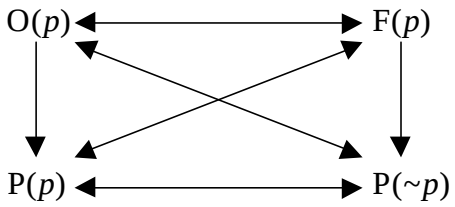


Figure 6 The deontic square

The italicized letter "p" stands for the content of a norm[3], i.e. an act proposition (and sometimes as a state of affairs). The other components of the norm such as the subject, authority, etc. are assumed to be uniformly satisfied. O, F and P represent the deontic concepts of obligated, forbidden (i.e. prohibited) and permission, respectively. Based on this square, some relations between the operators are defined:

3 Von Wright (1963).

O(*p*) and F(*p*) are contraries. That is, they cannot both be true but can both be false. O(*p*) and P (~*p*), as well as F (*p*) and P (*p*) are contradictories. This means they cannot both be true and either of them must be true.

The legal philosophical and theoretical analyses of normative conflict under the rubric of "normative inconsistency" is unsatisfactory as a model for explicating the phenomenon in that it is restricted to inconsistencies arising due to incompatibility of the deontic operators of the norms involved[4]. Thus the explication concerns only a limited number of instances that satisfy the condition of involving the same generic or one generic case and its negation.

Studies in systems of deontic logic have invariably occupied themselves with the interpretation of the deontic operators and their relation to each other. This move is motivated by the fact that statements containing the deontic operator for obligation (O), for example, may have different interpretations and consequently different truth values. Furthermore, the field of normative discourse contains more concepts such as *right* and *power* which can not be reduced to the standard deontic modalities and deserve special treatment. While we do recognize the significance of studies of these sorts, specially in relation to concepts such as right, power, immunity etc. (Kanger 1966; Lindahl 1977), our aim at this moment is not to investigate the adequacy of any of these systems over another. Instead, we are interested in the degree of attention offered in this approach to the role of world knowledge. We claim that this approach has as yet not give sufficient attention to the role world knowledge plays in normative conflicts. The discussion below will illustrate the significance we ascribe to the role of world knowledge in the analysis of normative conflicts.

4 Some further complications: Conclusions and further research

In this section, we further consider the problem of normative conflicts by discussing certain aspects of some types of conflicts and the problems they raise. It is to be noted that these conflicts arise due to the association of normative knowledge and world knowledge and in order that we are able to fully comprehend them we need further analysis of world knowledge. We make our conclusions simultaneously in this discussion and we point at the direction further research could take.

4.1 Genuine conflicts

A 'genuine conflict', in one sense of the notion, is a quandary or a dilemma. It refers to the situation in which compliance with one norm by a norm-subject implies violating another, and vice versa. The existence and non-existence of genuine conflict between legal (or between legal and other, e.g. moral) norms is a disputed issue in the literature. We do not intend to discuss this issue here. However, it is important to note a distinction between the problem of the existence of a conflict and the problem of how to solve this conflict. It is sometimes believed that if there is a method available for resolving conflicts in an unambiguous way, such as weighing the respective consequences of the relevant acts or principles for their ordering in terms of

4 Dissatisfaction with this approach is also expressed in Munzer (1973, p. 1144) and Hill (1987).

priority, then there is no conflict. But since there is a conflict to be resolved, then there is such a thing to state as a conflict.

We intend by our discussion of some examples of genuine conflicts to focus attention on some underlying categories, of the world knowledge type, embedded in legal knowledge and to make some distinctions and discern relations between these categories. We claim that such an approach would help us better comprehend the phenomenon of normative conflicts.

4.1.1 Act-types and normative conflicts

Cases such as that of the set of norms S2 = {**N2, N3}**

N2: 'it is prohibited to overtake'.
N3: 'it is obligatory to overtake'

would generally be considered as a quandary or dilemma.

This example exhibits an important characteristic of genuine conflicts: that they involve commanding norms[5]. Furthermore, the act-types prescribed by these norms are identical. However, despite the fact that the acts are identical (i.e. the same act-type), we still can distinguish between act-types as involved in norms by questioning their presuppositions and their relation to other act-types. For example, let us compare the act-type of the set S2 above to set S4 = {**N4, N5**} which consists of the norms:

N4: 'it is obligatory to kill'
N5: 'it is prohibited to kill'

What differences can we draw between the types of acts prescribed in the set of norms S2 = {**N2**, **N3**} and those in the set of norms S4 = {**N4**, **N5**}? The norms in either of the two sets would be considered to conflict in themselves[6] or as a compliance conflict as in (Lindahl 1993) but this way of characterisation blurs the subtle distinction we can draw. The matter is not simply that the difference between these sets of norms pertains to distinct act-types in that the former concern "overtaking" which is a different act-type from "killing" that is contained in the latter. In one sense, it is true that a norm subject addressed by S1 or S2 cannot simultaneously realize the norms of the set. But in another sense, the act-types are distinguishable with respect to what they presuppose. "Overtaking" presupposes in retrospect that one is engaged in driving and, accordingly, if one is not driving at all one is thus not confronted with this situation. The norms, in other

5 We will discuss the problem of whether or not permissive norms could also generate genuine conflicts below.

6 Munzer (1973) makes the distinction between rules which conflict in themselves and rules that conflict on a particular situation. According to him, "rules conflict in themselves does require that joint conformity to both is logically impossible. But it also requires (…) that on at least *some particular situation*, by performing or omitting the norm-act the rules might conflict". He defines rules conflict on a particular situation as " [T]hat two rules conflict on a *particular* situation by virtue of an act or omission by a norm subject presupposes that joint conformity to those rules is logically impossible. But it also requires that on *that* occasion the rules clash or collide" (p. 1144).

words, do not obligate one to drive a vehicle. Such a presupposition, however, does not hold for the "killing" as in the set of norms S2 there is not such a retrospective act presupposed. This way of analysing acts may furnish us means for the classification of conflict. In conclusion, ontologies for actions need to be researched and constructed which will help in the analysis of norm conflicts.

4.1.2 Act-type and the generation relation

Genuine conflicts in the sense defined above may also arise in the case where the acts involved are not identical, nor is one the negation of another, but totally different act-types. This would be a conflict on a particular occasion referred to above. Consider the set S5 = {**N6, N7**} which consists of:

N6: 'it is obligatory to rescue a person whose life is endangered'.
N7: 'it is prohibited to enter premises of the type M'.

These norms represent conflicts on a particular situation, and is a sub-type of compliance conflicts (Lindahl 1993). In order to say that these norms conflict, there must be an overlap between their respective generic cases. This may be, among other things, the fact that they are addressed to the same person. According to these norms, in the event of someone rescuing another whose live is endangered in premises of non-M type this person complies with the first norm without violating the second. If, however, the person to be rescued is in premises of the M-type the two norms are applicable and it depends on what the rescuing operation requires from the rescuer whether this situation generates a conflict. If, for example, he can rescue the other person without entering the premises, e.g. by calling fire brigades, he then complies with both norms. However, we can speak of a conflict between the norms only if the rescuing operation in this example necessitates entry into the premises.

It is clear that confing attention solely to the test of identical or one generic case and its negation does not prove profitable in their analysis. The notion of 'act generation', introduced by Alvin Goldman (Goldman 1970), may illuminate our understanding and analysing of this type of conflicts. According to the generation relations between acts, if an agent does B by doing A, then it is said that the latter act (i.e. A) generates the former (i.e. B).

Thus, to establish the conflict between the norms of S5, it is necessary to establish the relation between the acts generated by the exemplification of one act-type and the exemplification of the other act-type. For example, in the case above it must be necessary for the performance of the act of rescuing, and hence compliance with **N6,** that the agent performs the act of *entering* the premises. This act of entering, however, may not be considered in this case as an act-type (though in much other case it can rightly be so) but an act generated by the performance of another act (i.e. rescuing). The agents intentions and believes for entering in this case are different than on other occasions in which this act is not performed. The analysis of categories such as acts, intentions etc. belongs to world knowledge.

The example also points at another dimension of legal norms. Most legal norms are spatially oriented in that they apply to spaces. **N7** above is a clear example of such a norm with relation to space. Other norms may also have spatial connection though this may not be too obvious as it may be

presupposed by the norm or left as part of common sense knowledge. **N6** above may be an example. However, to establish this we have to dig into the presupposition of the legal norm as, in this case, 'rescuing' necessarily takes place in a space.

4.1.3 Agent intentions and permissive norms

We mentioned above that the role permissive norms play in normative conflicts is a debated issue in the literature. In this section we discuss two situations in which permissive norms are involved in norm conflicts.

Conflicts between permissive norms and imperative norms
Situations as in that of S1 above between a permissive norm and an imperative norm is not generally regarded as a genuine conflict, in the sense of the term we use here. It is often argued that permissive norms may not be acted upon. Thus they do not force the norm subject into a quandary. That is, if the norm subject does not avail himself of the permissive norm (i.e. **N1**), then there is no conflict.

Some authors have argued (Hart 1970; Munzer 1973; Hill 1987; Lindahl 1993) against this reasoning. The common opinion between these authors maintains that it suffices that there is a possibility for a conflict in case the norm-subject avails himself of the permissive norm. However, they do not regard these as genuine conflicts.

Conflicts between permissive norms:
A more interesting debate is taking place with respect to the possibility of conflict between permissive norm themselves. Not all authors (mentioned above) who hold the view that these norms could conflict with imperative norms accept the view that these norms may conflict. Among those who accept the view that permissive norms may conflict with other permissive norms is (Munzer 1973) and (Hill 1987). However, Munzer's analysis ultimately assimilates these conflicts to situations involving permissive and imperative norms. There seem to be other types of conflict as that between the permission for A to live in a certain house and a permission for B to destroy that same house. These conflicts need our attention and have to be embodied in a theory on normative conflicts.

The strategy we suggest for the analysis of this conflict is to focus on the intentions of both the lawmaker and the norm-subject. In this way we partly agree with Hill. The norm subject acts to further his interests and make use of the facilities the law furnishes him with. Thus, his intentions play an important role in the deliberation and carrying out of his acts and forbearances and for this reason permissions need to be carefully considered.

In conclusion, we do not argue that approaching normative consistency from the vantage point of the function of deontic operators should be abandoned completely. But it cannot be accepted as it is. It is perhaps useful to supplement it with further analysis of the presuppositions upon which the norms are created. In this line we suggested further analysis in respect of the acts prescribed by norms, intentions of the lawmaker and norm-subjects, and spatial relations and other presupposition involved in norms.

References

Alchourron 1981

C. E. Alchourron & E. Bulygin, 'Expressive Conception of Norms', in: R. Hilpinen (ed.), *New Studies in Deontic Logic,* Dordrecht: D. Reidel Publishing Company, 1981.

Breuker & Den Haan 1991

J. Breuker and N. den Haan, 'Separating World Knowledge and Regulation Knowledge: Where is the Logic', in: *Proceedings of the Third International Conference in Artificial Intelligence and Law,* (Oxford), New York: ACM Press, 1991.

Den Haan 1992

N. den Haan, 'TRACS A Support Tool for Drafting and Testing Law', in: C.A.F.M. Grütters et al. (eds), *Information Technology and Law. Fifth International Conference on Legal Knowledge Based Sytems, JURIX 1992.* Lelystad: Koninklijke Vermande, 1992.

Den Haan 1993

N. den Haan, 'Towards Support Tools for Drafting Legislation', in: J.S. Svensson, J.G.J. Wassink and B. van Buggenhout (eds), *Intelligent Tools for Drafting and Computer-Supported Comparison of Law. Sixth International Conference on Legal Knowledge-Based Systems, JURIX 1993,* Lelystad: Koninklijke Vermande, 1993.

Den Haan 1996

N. den Haan, *Automated Legal Reasoning,* Ph.D. thesis, University of Amsterdam, 1996.

Goldman 1970

A. Goldman, *A Theory of Human Action,* Princeton: Princeton University Press, 1970.

Hart 1970

H.L.A. Hart, 'Kelsen's Doctrine of the Unity of Law', in: Keifer and Munitz (eds), *Ethics and Social Justice,* Albany: SUNY Press, 1970, pp. 171-199.

Hart 1994

H.L.A. Hart, *The Concept of Law,* Oxford: Clarendon Press, 1994.

Hill 1987

H. Hill, 'A Functional Taxonomy of Normative Conflict', in: *Law and Philosophy* 6, 1987, pp. 227-247.

Hilpinen 1985

R. Hilpinen, 'Normative Conflicts and Legal Reasoning', in: E. Bulygin, Jean-Louis Gadries and I. Niiniluoto (eds.), *Man, Law and Modern Forms of Life,* Dordrecht/Boston: D. Reidel Publishing Company, 1985.

Huisje 1981

C.H. Huisje, *Norm and Logic.* Ph. D. thesis, Rijksuniversiteit Groningen. 1981.

Jones & Sergot 1992

Andrew J.I. Jones and Marek Sergot, 'Deontic Logic in the Representation of Law: Towards a Methodoloy', in: *Artificial Intelligence and Law*, vol. 1, no. 1, 1992.

JURIX 1993

J.S. Svensson, J.G.J. Wassink and B. van Buggenhout (eds), *Intelligent Tools for Drafting and Computer-Supported Comparison of Law. Sixth International Conference on Legal Knowledge-Based Systems, JURIX 1993,* Lelystad: Koninklijke Vermande, 1993.

Kanger 1972

S. Kanger, 'Law and Logic', in: *Theoria,* vol. 38, 1972, pp. 105-132.

Kelsen 1973

H. Kelsen, *Essays in Legal and Moral Philosophy*, in: O. Weinberger & D. Reidel (eds.), Dordrecht: Publishing Company, 1973.

Kelsen 1967

Kelsen H., *Pure Theory of Law,* (translation Max Knight), Berkeley/Los Angeles: University of California Press, 1967.

Lindahl 1992

L. Lindahl, 'Conflicts in Systems of Legal Norms: A logical point of View', in: B. Brouwer, Ton Hol, Arend Soeteman, Willem van der Velden and Arie de Wild (eds.), *Coherence and Conflict in Law,* Proceedings of the 3rd Benelux-Scandinavian Symposium on Legal Theory, Amsterdam/Deventer/Boston: Kluwer Publisher, 1991, pp. 39-64.

Lindahl 1977

L. Lindahl, *Position and Change: A Study in Law and Logic*, Dordrecht/ Boston: D. Reidel Publishing Company, 1977.

Lodder 1998

A.R. Lodder, *DiaLaw, On Legal Justification and dialog Games,* Ph. D. thesis, Universiteit Maastricht, 1998.

Munzer 1973

S. Munzer, 'Validity and Legal Conflicts', in: *Yale Law Journal,* vol. 82, 1973, pp. 1140-1174.

Prakken 1992

H. Prakken, *Logical Tools for Modelling Legal Argument*, Ph. D. thesis, Vrije Universiteit Amsterdam, 1992.

Raz 1972

J. Raz, 'Principle and the Limit of Law', in: *Yale Law Journal*, vol. 81, 1972, pp. 823-854.

Raz 1980

J. Raz, *The Concept of a Legal Systeem*, Oxford: Clarendon Press, 1980.

Ross 1958

Alf Ross, *On Law and Justice*, London: Stevens & Sons, 1958.

Royakkers 1996

L. Royakkers, *Representing Legal Rules in Deontic Logic,* Ph. D. thesis, Katholieke Universiteit Brabant, Tilburg 1996.

Sartor 1992

G. Sartor, 'Normative Conflicts in Legal Reasoning', in: *Artificial Intelligence and Law* 1, 1992**,** (2-3), pp. 209-35.

Valente 1995

A. Valente, *Legal Knowledge Engineering, A Modelling Approach,* Amsterdam: IOS Press, 1995.

Von Wright 1963

G.H. Von Wright, *Norm and Action,* Routledge & Paul Kegan, 1963.

Winkels et al. 1998

Radboud Winkels, Alexander W. F. Boer, Joost A. Breuker & Doeko Bosscher, 'Assessment Based Legal Information Serving and Cooperative Dialogue in CLIME', in: J.C. Hage et al. (eds.), *Legal Knowledge Based Systems. JURIX 1998: The Eleventh Conference,* (Groningen), Nijmegen: Gerard Noodt Instituut (GNI), 1998, pp. 131-146.