

Splitting Assumption-Based Argumentation Frameworks

Extended Abstract

Giovanni Buraglio

TU Wien

Wien, Austria

giovanni.buraglio@tuwien.ac.at

Wolfgang Dvořák

TU Wien

Wien, Austria

wolfgang.dvorak@tuwien.ac.at

Stefan Woltran

TU Wien

Wien, Austria

stefan.woltran@tuwien.ac.at

ABSTRACT

In this paper, we study the concept of splitting in Assumption-Based Argumentation (ABA). This provides a divide-and-conquer strategy for addressing computational intractability of core reasoning tasks in ABA. In particular, we show how extensions of a given framework can be computed incrementally by restricting the search space to sub-frameworks only, and then combining the obtained results. We first consider splitting on the argument-graph induced by an ABAF, and later adapt the approach to ABA frameworks, in order to avoid the potentially high cost of building the graph.

KEYWORDS

Assumption-Based Argumentation; Splitting; Collective Attacks

ACM Reference Format:

Giovanni Buraglio, Wolfgang Dvořák, and Stefan Woltran. 2026. Splitting Assumption-Based Argumentation Frameworks: Extended Abstract. In *Proc. of the 25th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2026)*, Paphos, Cyprus, May 25 – 29, 2026, IFAAMAS, 3 pages. <https://doi.org/10.65109/LPCA5015>

1 INTRODUCTION

Computational models of argumentation in AI [14] offer formal approaches to represent and reason over debates involving conflicting information. They play a central role in multi-agent systems, specifically when agents engage in group decision-making, persuasion, or negotiation dialogues [7, 9, 12, 15, 16, 27]. Among these, Assumption-Based Argumentation (ABA) [5] captures argumentative scenarios by means of so-called ABA frameworks (ABAFs), or ABA knowledge bases, consisting of a set of defeasible sentences (assumptions) and inference rules. Argumentative reasoning can be performed in ABA following two different approaches. The *direct* approach, typically employed by ABA solvers [20, 21], allows to reason over the ABA knowledge base itself through semantics defined at the level of assumptions. In contrast, the *indirect* approach [18] realises reasoning in two steps: first an argument graph comprising arguments and their relations is generated from the ABAF, via the so-called *instantiation* procedure; then, *semantics* from abstract argumentation are applied to the obtained graph to find acceptable sets of arguments, along with the assumptions supporting them.

Although ABA is a well-established formalism, with several application settings [11, 13, 26], the high computational complexity

of core reasoning tasks in ABA poses a significant challenge for its deployment in practice [8]. This issue is further aggravated when ABAFs are instantiated into argument graphs, such as Dung’s Argumentation Frameworks (AFs) [10] or Argumentation Frameworks with Collective Attacks (SETAFs) [25], as the instantiation itself can be computationally expensive and may result in exponentially large graphs [19]. One prominent strategy to address computational intractability is to optimise reasoning through divide-and-conquer algorithms, with *splitting* being a paradigmatic example of this approach in knowledge representation and reasoning [1–4, 22–24, 28]. This approach focuses on incrementally computing the extensions of a given argumentation framework by means of the extension of its sub-frameworks, thereby avoiding to consider the entire solution-space of the original framework.

Despite the successful application in graph-based argumentation, splitting, so far, has been neglected for rule-based argumentation systems like ABA. A straightforward attempt to apply splitting in ABA would be to first instantiate the ABAF to a corresponding Dung’s AF and then perform AF splitting. However, the exponential number of auxiliary arguments introduced during instantiation might invalidate the usefulness of splitting. To overcome this limitation, we instead consider the instantiation of ABAFs as SETAFs, which yield more concise graphical representations [17]. Thus, we first develop a splitting scheme for SETAFs, enabling incremental computation for the indirect approach of reasoning. Further, to avoid the (potentially high) cost of instantiation, we present a splitting schema that operates directly on ABA knowledge bases.

2 PRELIMINARIES

An assumption-based argumentation framework (ABAF) is a tuple $D = (\mathcal{L}, \mathcal{R}, \mathcal{A}, \bar{\cdot})$, where \mathcal{L} is a set of sentences and \mathcal{R} a set of rules over \mathcal{L} . A rule $r \in \mathcal{R}$ has the form $a_0 \leftarrow a_1, \dots, a_n$ with $a_i \in \mathcal{L}$, $body(r) = \{a_1, \dots, a_n\}$ and $head(r) = a_0$. Moreover, $\mathcal{A} \subseteq \mathcal{L}$ is a set of assumptions, and $\bar{\cdot} : \mathcal{A} \rightarrow \mathcal{L}$ a total mapping from assumptions to their contrary. We assume ABAFs to be flat, i.e. assumptions do not occur as rule-heads. We use $S \vdash^R q$ to say that a sentence q is derivable from $S \subseteq \mathcal{A}$ via rules $R \subseteq \mathcal{R}$. A set of assumptions $S \subseteq \mathcal{A}$ attacks $T \subseteq \mathcal{A}$ if $S \vdash \bar{a}$ for some $a \in T$. A set S is conflict-free in D if it does not attack itself; S defends T iff it attacks each attacker of T ; S is admissible if it is conflict-free and defends itself; S is a complete extension iff it contains every assumption set it defends; S is a preferred extension ($S \in \text{pref}(D)$) iff it is the \subseteq -maximal complete extension; S is stable iff S attacks each $\{x\} \subseteq \mathcal{A} \setminus S$. For a set S of assumptions, an assumption a is: accepted wrt S if $a \in S$; rejected wrt S if S attacks a ; undecided wrt S otherwise.

Moreover, ABAFs can be represented as argumentation frameworks with collective attacks (SETAFs) [17, 25]. Shortly, a SETAF is



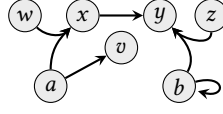
This work is licensed under a Creative Commons Attribution International 4.0 License.

Proc. of the 25th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2026), C. Amato, L. Dennis, V. Mascardi, J. Thangarajah (eds.), May 25 – 29, 2026, Paphos, Cyprus. © 2026 International Foundation for Autonomous Agents and Multiagent Systems (www.ifaamas.org). <https://doi.org/10.65109/LPCA5015>

a pair $F = (A, R)$ where A is a finite set of *arguments*, and $R \subseteq 2^A \times A$ an *attack relation*. An ABAF $D = (\mathcal{L}, \mathcal{R}, \mathcal{A}, \bar{\cdot})$ can be instantiated as the (semantically equivalent) SETAF $F_D = (A_D, R_D)$ by setting $A_D = \mathcal{A}$ and $(S, a) \in R_D$ iff $S \vdash \bar{a}$ [17].

EXAMPLE 1. For the ABAF $D = (\mathcal{L}, \mathcal{R}, \mathcal{A}, \bar{\cdot})$ (left) and its corresponding SETAF F (right), it holds that $\{a, w, z\} \in \text{pref}(D) = \text{pref}(F)$.

$$\begin{aligned} \mathcal{A} &= \{a, b, v, w, x, y, z\} \\ \mathcal{L} &= \mathcal{A} \cup \bar{\mathcal{A}} \cup \{p\} \\ \mathcal{R} &= \{\bar{b} \leftarrow b, p \leftarrow a, \bar{v} \leftarrow a, \\ &\quad \bar{x} \leftarrow p, w, \bar{y} \leftarrow x, \bar{y} \leftarrow \bar{b}, z\} \end{aligned}$$



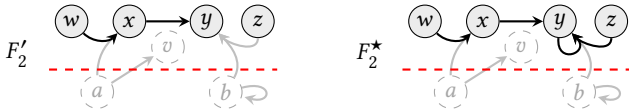
We now recall Baumann's *splitting schema* for Dung AFs [2]. First, an AF F is split into two sub-frameworks F_1 and F_2 separated by a set of attacks R_3 going from F_1 to F_2 . Then, the information contained in an extension E_1 of F_1 is propagated to F_2 via some syntactic alteration. This is realized in two steps. First, F_2 is pruned based on accepted and rejected arguments wrt E_1 , thus obtaining the *reduct* F'_2 . Later, F'_2 is expanded to F_2^* via the so-called *modification*, incorporating information on undecided arguments wrt E_1 : self-attacks are propagated from F_1 to arguments in F_2 . Using this schema, it is possible to split the AF and compute the extensions for each sub-framework incrementally such that their combination yields extensions of the original framework.

3 SPLITTING COLLECTIVE ATTACKS

Towards a splitting approach for ABA we first introduce a splitting schema for SETAFs, as their correspondence with ABAFs paves the way for the splitting schema on the ABA knowledge base.

As for AFs, the general idea is to compute extensions of F as a combination of extensions of F_1 and F_2 following the *schema* above. Intuitively, the SETAF reduct removes the arguments in F_2 that are already defeated by E_1 . Further, an attack (S, t) in F_2 is removed if one of the arguments in $S \cup t$ is defeated by E_1 . Finally, an attack $(S, t) \in R_3$ is neglected if an argument in $S \cup t$ is defeated by E_1 , all the arguments in S are in A_1 , or there is an argument in $S \cap A_1$ that is not accepted wrt E_1 . The remaining attacks are simplified by removing the arguments of A_1 from S . After computing F'_2 , we *modify* it to deal with attacks $(S, t) \in R_3$ that rely on undecided arguments wrt E_1 . We add to F'_2 a self-attack from t (together with the F_2 -part of the attack) to itself. Consider the following example.

EXAMPLE 2. We split the SETAF F of Example 1 separating $A_1 = \{a, b\}$ from $A_2 = \{v, w, x, y, z\}$. We pick the preferred extension $E_1 = \{a\}$ of F_1 , and compute the reduct F'_2 by deleting v (attacked by E_1), projecting $(\{a, w, x\})$ to $(\{w, x\})$ and neglect $(\{b, z\}, y)$. Subsequently, we construct F_2^* by adding the set-self-attack $(\{y, z\}, y)$ to F'_2 .



Finally, we obtain $E_2 = \{w, z\}$ as the preferred extension of F_2^* , retrieving $E = E_1 \cup E_2 = \{a, w, z\}$ as a preferred extension of F .

For all semantics considered we show that (1) combining extensions of F_1 and F_2^* yield extensions of F , and (2) extensions of F induce extensions in F_1 and F_2^* , when restricted to A_1 and A_2^* .

However, while instantiating ABAFs into SETAFs has been shown useful in specific contexts [6, 26], it can yield an exponential growth in the number of attacks generated, thus increasing in input size. Hence, to enable an efficient form of splitting, we propose a splitting schema tailored to the syntactic structure of ABAFs.

4 SPLITTING ABA FRAMEWORKS

A splitting for an ABAF D is identified with a set of sentences $S \subseteq \mathcal{L}$ such that for all $r \in \mathcal{R}$, $\text{head}(r) \in S$ implies $\text{body}(r) \subseteq S$ and S contains all assumptions whose contrary appears in S . The splitting set partitions the D into two sub-frameworks D_1 and D_2 such that no contrary of an assumption in D_1 is derivable in D_2 . Thus, assumptions in D_1 can be evaluated independently of D_2 .

Again, we follow the splitting schema and appeal to the notions of *reduct* and *modification* in application to D_2 . First, we build the reduct wrt an extension E_1 of D_1 , by removing from R_2 : the rules whose body atoms are not derivable from E_1 ; all sentences derivable from E_1 . In the second step, we modify the reduct to propagate the information about undecided assumptions wrt E_1 . Since their status can be transmitted to other assumptions via rules, we define the set of *undecided sentences* \mathcal{L}_1^U , as those derivable from some undecided (but no rejected) assumptions wrt E_1 . Thus, when \mathcal{L}_1^U is not empty, we introduce: a fresh assumption x_u ; a rule $\bar{x}_u \leftarrow x_u$; a modified version of every rule with some undecided (but no incompatible) sentence in the body. We illustrate this in the following example.

EXAMPLE 3. Let D be the ABAF from Example 1. For a splitting set $S = \{a, b, \bar{a}, \bar{b}, p\}$, we get: D_1 with $\mathcal{L}_1 = S$ and $\mathcal{R}_1 = \{\bar{b} \leftarrow b, p \leftarrow a\}$; D_2 with $\mathcal{L}_2 = \mathcal{L} \setminus S$ and $\mathcal{R}_2 = \mathcal{R} \setminus \mathcal{R}_1$. Then, from $\{a\} \in \text{pref}(D_1)$ we build the reduct $D'_2 = (\mathcal{L}_2, \mathcal{R}'_2, \mathcal{A}_2, \bar{\cdot})$, where \mathcal{R}'_2 is given by:

$$\bar{v} \leftarrow a \quad \bar{x} \leftarrow w, p \quad \bar{y} \leftarrow x \quad \bar{y} \leftarrow \bar{b}, z$$

Moreover, as b is the only undecided assumption, and $\bar{b} \in \mathcal{L}_1^U$ is a sentence derivable from it, the modification is triggered by $\bar{y} \leftarrow \bar{b}, z$. We then construct D_2^* with $\mathcal{L}_2^* = \mathcal{L}_2 \cup \{x_u, \bar{x}_u\}$ and \mathcal{R}_2^* given by:

$$\bar{v} \leftarrow \quad \bar{x} \leftarrow w \quad \bar{y} \leftarrow x \quad \bar{y} \leftarrow x_u, z \quad \bar{x}_u \leftarrow x_u$$

Since $\{w, z\} \in \text{pref}(D_2^*)$, we get $\{a, w, z\}$ as for Examples 1 and 2.

As for SETAFs, our results show that (1) combining extensions of D_1 and D_2^* yield extensions of D , and (2) extensions of D induce extensions in D_1 and D_2^* , when restricted to \mathcal{A}_1 and \mathcal{A}_2^* .

5 CONCLUSION AND FUTURE WORK

In this paper, we have presented a modification-based approach to splitting in assumption-based argumentation. Our work tackles the issue directly (at the knowledge base level) and indirectly (on the induced SETAF). Moreover, each step involved can be carried out efficiently and implemented on top of common ABA (or SETAF) solvers. Therefore, in future work we plan to implement our algorithm and evaluate its performance [4].

ACKNOWLEDGMENTS

This work was funded in part by the Austrian Science Fund (FWF) 10.55776/COE12, and was supported by the European Union's Horizon 2020 research and innovation programme (grant agreement 101034440).

REFERENCES

- [1] Pietro Baroni, Massimiliano Giacomin, and Beishui Liao. 2014. On topology-related properties of abstract argumentation semantics. A correction and extension to Dynamics of argumentation systems: A division-based method. *Artif. Intell.* 212 (2014), 104–115. <https://doi.org/10.1016/J.ARTINT.2014.03.003>
- [2] Ringo Baumann. 2011. Splitting an Argumentation Framework. In *Logic Programming and Nonmonotonic Reasoning - 11th International Conference, LPNMR 2011, Vancouver, Canada, May 16-19, 2011. Proceedings (Lecture Notes in Computer Science, Vol. 6645)*, James P. Delgrande and Wolfgang Faber (Eds.), Springer, 40–53. https://doi.org/10.1007/978-3-642-20895-9_6
- [3] Ringo Baumann, Gerhard Brewka, Wolfgang Dvorák, and Stefan Woltran. 2012. Parameterized Splitting: A Simple Modification-Based Approach. In *Correct Reasoning - Essays on Logic-Based AI in Honour of Vladimir Lifschitz (Lecture Notes in Computer Science, Vol. 7265)*, Esra Erdem, Joohyung Lee, Yuliya Lierler, and David Pearce (Eds.), Springer, 57–71. https://doi.org/10.1007/978-3-642-30743-0_5
- [4] Ringo Baumann, Gerhard Brewka, and Renata Wong. 2011. Splitting Argumentation Frameworks: An Empirical Evaluation. In *Theorie and Applications of Formal Argumentation - First International Workshop, TFAFA 2011, Barcelona, Spain, July 16-17, 2011, Revised Selected Papers (Lecture Notes in Computer Science, Vol. 7132)*, Sanjay Modgil, Nir Oren, and Francesca Toni (Eds.), Springer, 17–31. https://doi.org/10.1007/978-3-642-29184-5_2
- [5] Andrei Bondarenko, Phan Minh Dung, Robert A. Kowalski, and Francesca Toni. 1997. An Abstract, Argumentation-Theoretic Approach to Default Reasoning. *Artif. Intell.* 93 (1997), 63–101. [https://doi.org/10.1016/S0004-3702\(97\)00015-5](https://doi.org/10.1016/S0004-3702(97)00015-5)
- [6] Giovanni Buraglio, Wolfgang Dvorák, Matthias König, and Markus Ulbricht. 2024. Justifying Argument Acceptance with Collective Attacks: Discussions and Disputes. In *Proceedings of the Thirty-Third International Joint Conference on Artificial Intelligence, IJCAI 2024, Jeju, South Korea, August 3-9, 2024*. ijcai.org, 3281–3288. <https://www.ijcai.org/proceedings/2024/363>
- [7] Álvaro Carrera and Carlos Angel Iglesias. 2015. A systematic review of argumentation techniques for multi-agent systems research. *Artif. Intell. Rev.* 44, 4 (2015), 509–535. <https://doi.org/10.1007/S10462-015-9435-9>
- [8] Kristijonas Cyras, Quentin Heinrich, and Francesca Toni. 2021. Computational complexity of flat and generic Assumption-Based Argumentation, with and without probabilities. *Artif. Intell.* 293 (2021), 103449. <https://doi.org/10.1016/J.ARTINT.2020.103449>
- [9] Yannis Dimopoulos, Jean-Guy Mailly, and Pavlos Moraitis. 2019. Argumentation-based Negotiation with Incomplete Opponent Profiles. In *Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems, AAMAS '19, Montreal, QC, Canada, May 13-17, 2019*, Edith Elkind, Manuela Veloso, Noa Agmon, and Matthew E. Taylor (Eds.), International Foundation for Autonomous Agents and Multiagent Systems, 1252–1260. <http://dl.acm.org/citation.cfm?id=3331829>
- [10] Phan Minh Dung. 1995. On the Acceptability of Arguments and its Fundamental Role in Nonmonotonic Reasoning, Logic Programming and n-Person Games. *Artif. Intell.* 77, 2 (1995), 321–358. [https://doi.org/10.1016/0004-3702\(94\)00041-X](https://doi.org/10.1016/0004-3702(94)00041-X)
- [11] Xiuyi Fan. 2018. On Generating Explainable Plans with Assumption-Based Argumentation. In *PRIMA 2018: Principles and Practice of Multi-Agent Systems - 21st International Conference, Tokyo, Japan, October 29 - November 2, 2018, Proceedings (Lecture Notes in Computer Science, Vol. 11224)*, Tim Miller, Nir Oren, Yuko Sakurai, Itsuki Noda, Bastin Tony Roy Savarimuthu, and Tran Cao Son (Eds.), Springer, 344–361. https://doi.org/10.1007/978-3-030-03098-8_21
- [12] Xiuyi Fan and Francesca Toni. 2012. Agent Strategies for ABA-based Information-seeking and Inquiry Dialogues. In *ECAI 2012 - 20th European Conference on Artificial Intelligence. Including Prestigious Applications of Artificial Intelligence (PAIS-2012) System Demonstrations Track, Montpellier, France, August 27-31, 2012 (Frontiers in Artificial Intelligence and Applications, Vol. 242)*, Luc De Raedt, Christian Bessière, Didier Dubois, Patrick Doherty, Paolo Frasconi, Fredrik Heintz, and Peter J. F. Lucas (Eds.), IOS Press, 324–329. <https://doi.org/10.3233/978-1-61499-098-7-324>
- [13] Xiuyi Fan, Francesca Toni, Andrei Mocanu, and Matthew Williams. 2014. Dialogical two-agent decision making with assumption-based argumentation. In *AAMAS '14*. 533–540. <http://dl.acm.org/citation.cfm?id=2615818>
- [14] Dov Gabbay, Massimiliano Giacomin, Guillermo R. Simari, and Matthias Thimm (Eds.). 2021. *Handbook of Formal Argumentation*. Vol. 2. College Publications.
- [15] Yang Gao, Francesca Toni, Hao Wang, and Fanjiang Xu. 2016. Argumentation-Based Multi-Agent Decision Making with Privacy Preserved. In *Proceedings of the 2016 International Conference on Autonomous Agents & Multiagent Systems, Singapore, May 9-13, 2016*, Catholijn M. Jonker, Stacy Marsella, John Thangarajah, and Karl Tuyls (Eds.), ACM, 1153–1161. <http://dl.acm.org/citation.cfm?id=2937093>
- [16] Emmanuel Hadoux, Anthony Hunter, and Sylwia Polberg. 2023. Strategic argumentation dialogues for persuasion: Framework and experiments based on modelling the beliefs and concerns of the persuadee. *Argument Comput.* 14, 2 (2023), 109–161. <https://doi.org/10.3233/AAC-210005>
- [17] Matthias König, Anna Rapberger, and Markus Ulbricht. 2022. Just a Matter of Perspective. In *Computational Models of Argument - Proceedings of COMMA 2022, Cardiff, Wales, UK, 14-16 September 2022 (Frontiers in Artificial Intelligence and Applications, Vol. 353)*, Francesca Toni, Sylwia Polberg, Richard Booth, Martin Caminada, and Hiroyuki Kido (Eds.), IOS Press, 212–223. <https://doi.org/10.3233/FAIA220154>
- [18] Tuomo Lehtonen, Anna Rapberger, Francesca Toni, Markus Ulbricht, and Johannes Peter Wallner. 2024. Instantiations and Computational Aspects of Non-Flat Assumption-based Argumentation. In *Proceedings of the Thirty-Third International Joint Conference on Artificial Intelligence, IJCAI 2024, Jeju, South Korea, August 3-9, 2024*. ijcai.org, 3457–3465. <https://www.ijcai.org/proceedings/2024/383>
- [19] Tuomo Lehtonen, Anna Rapberger, Markus Ulbricht, and Johannes Peter Wallner. 2023. Argumentation Frameworks Induced by Assumption-based Argumentation: Relating Size and Complexity. In *Proceedings of the 20th International Conference on Principles of Knowledge Representation and Reasoning, KR 2023, Rhodes, Greece, September 2-8, 2023*, Pierre Marquis, Tran Cao Son, and Gabriele Kern-Isberner (Eds.), 440–450. <https://doi.org/10.24963/KR.2023/43>
- [20] Tuomo Lehtonen, Johannes Peter Wallner, and Matti Järvisalo. 2021. Declarative Algorithms and Complexity Results for Assumption-Based Argumentation. *J. Artif. Intell. Res.* 71 (2021), 265–318. <https://doi.org/10.1613/JAIR.1.12479>
- [21] Tuomo Lehtonen, Johannes Peter Wallner, and Matti Järvisalo. 2021. Harnessing Incremental Answer Set Solving for Reasoning in Assumption-Based Argumentation. *Theory Pract. Log. Program.* 21, 6 (2021), 717–734. <https://doi.org/10.1017/S1471068421000296>
- [22] Beishui Liao. 2013. Toward incremental computation of argumentation semantics: A decomposition-based approach. *Ann. Math. Artif. Intell.* 67, 3-4 (2013), 319–358. <https://doi.org/10.1007/S10472-013-9364-8>
- [23] Vladimir Lifschitz and Hudson Turner. 1994. Splitting a Logic Program. In *Logic Programming, Proceedings of the Eleventh International Conference on Logic Programming, Santa Marherita Ligure, Italy, June 13-18, 1994*, Pascal Van Hentenryck (Ed.), MIT Press, 23–37.
- [24] Thomas Linsbichler. 2014. Splitting Abstract Dialectical Frameworks. In *Computational Models of Argument - Proceedings of COMMA 2014, Atholl Palace Hotel, Scottish Highlands, UK, September 9-12, 2014 (Frontiers in Artificial Intelligence and Applications, Vol. 266)*, Simon Parsons, Nir Oren, Chris Reed, and Federico Cerutti (Eds.), IOS Press, 357–368. <https://doi.org/10.3233/978-1-61499-436-7-357>
- [25] Søren Holbech Nielsen and Simon Parsons. 2006. A Generalization of Dung’s Abstract Framework for Argumentation: Arguing with Sets of Attacking Arguments. In *Argumentation in Multi-Agent Systems, Third International Workshop, ArgMAS 2006, Hakodate, Japan, May 8, 2006, Revised Selected and Invited Papers (Lecture Notes in Computer Science, Vol. 4766)*, Nicolas Maudet, Simon Parsons, and Iyad Rahwan (Eds.), Springer, 54–73. https://doi.org/10.1007/978-3-540-75526-5_4
- [26] Fabrizio Russo, Anna Rapberger, and Francesca Toni. 2024. Argumentative Causal Discovery. In *Proceedings of the 21st International Conference on Principles of Knowledge Representation and Reasoning, KR 2024, Hanoi, Vietnam, November 2-8, 2024*, Pierre Marquis, Magdalena Ortiz, and Maurice Pagnucco (Eds.). <https://doi.org/10.24963/KR.2024/88>
- [27] Francesca Toni. 2013. A generalised framework for dispute derivations in assumption-based argumentation. *Artif. Intell.* 195 (2013), 1–43. <https://doi.org/10.1016/J.ARTINT.2012.09.010>
- [28] Hudson Turner. 1996. Splitting a Default Theory. In *Proceedings of the Thirteenth National Conference on Artificial Intelligence and Eighth Innovative Applications of Artificial Intelligence Conference, AAAI 96, IAAI 96, Portland, Oregon, USA, August 4-8, 1996, Volume 1*, William J. Clancey and Daniel S. Weld (Eds.). AAAI Press / The MIT Press, 645–651. <http://www.aaai.org/Library/AAAI/1996/aaai96-096.php>