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Plurivalent Logic for Multi-Agent Systems

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Dynamic Epistemic Logic is versatile in knowledge representation, however, its Kripke semantics requires a huge number of possible worlds, and furthermore, the combinatorial number of access relations complicates the description and is not intelligible. On the contrary, sometimes we need more to express; e.g, we want to distinguish between legible information and illegible one, and so on. To solve such problems, we employ many-valued logic to the multi-agent system. We extend the semantics of epistemic logic to 4-valued one to distinguish the public propositions and private propositions. Plurivalent Logic provides multiple valuation functions; one strictly refers to logical truth and so do others to various agent's epistemic states. Therefore the logic simply simulates epistemic logic, weak Kleene logic, and paraconsistent Kleene logic, with simple designated-value changes.