ChatGPT

Year	Conference/ Journal	Paper Title	Category	Abstract	Link
2025	arXiv (preprint)	VerIso: Verifiable Isolation Guarantees for Database Transactions	Protocol verification	VerIso introduces a rigorous framework for verifying isolation guarantees using Isabelle/HOL. It models the strict two-phase locking protocol and proves that it provides strict serializability; the authors also use the framework to identify isolation bugs in the TAPIR protocol [1].	https://arxiv.org/abs/2503.06284
2025	CAV 2025	On the Complexity of Checking Mixed Isolation Levels for SQL Transactions	Execution history verification	This work studies the complexity of testing isolation level implementations when transactions use mixed isolation levels in SQL. The authors show that many restrictions are NP-complete and propose an algorithm that is exponential-time in general but polynomial-time for relevant cases [2].	https://link.springer.com/chapter/10.1007/978-3-031-56568-4_33

Year	Conference/ Journal	Paper Title	Category	Abstract	Link
2025	TACAS 2025	Pushing the Limit: Verified Performance-Optimal Causally-Consistent Database Transactions	Protocol verification	The authors design Eiger-PORT+, a protocol that achieves a strong form of causal consistency (TCCv). They deductively verify the protocol and show through experiments that it achieves superior performance compared with existing solutions [3].	https://link.springer.com/chapter/10.1007/978-3-031-57245-3_22
2024	OOPSLA 2024	Plume: Efficient and Complete Black-Box Checking of Weak Isolation Levels	Execution history verification	Plume provides a modular black-box checker for weak isolation levels. It uses vector clocks and tree clocks to capture dependencies, reproduces known isolation violations and discovers new ones in several DBMSs; it detects more anomalies than prior tools [4].	https://dl.acm.org/doi/10.1145/3622673

Year	Conference/ Journal	Paper Title	Category	Abstract	Link
2025	PLDI 2025	Dynamic Robustness Verification Against Weak Memory	Client program robustness verification	The paper proposes a dynamic verification algorithm using location clocks to check whether a program remains correct under C11-style memory models. The tool RSAN checks program executions against the memory model; evaluation shows the approach can verify robustness with modest overheads [5] .	https://arxiv.org/abs/2504.15036
2025	arXiv (preprint)	Vbox: Efficient Black-Box Serializability Verification	Execution history verification	Vbox proposes a new black-box serializability verification technique that supports predicate operations. By using transaction time information and a simpler SAT formulation, Vbox efficiently verifies serializability across different protocols [6] .	https://arxiv.org/abs/2503.05163

Year	Conference/ Journal	Paper Title	Category	Abstract	Link
2024	ICSE 2024	Understanding Transaction Bugs in Database Systems	Client program verification	This empirical study analyzes 140 transaction bugs from MySQL, PostgreSQL, SQLite and other systems. The authors categorize bug manifestations, root causes and impacts, and provide guidance for detection and verification techniques [7].	https://doi.org/10.1145/3597503.3623390
2023	ICSE 2023	Detecting Isolation Bugs via Transaction Oracle Construction (Troc)	Execution history verification	Troc decouples a transaction into independent statements executed on separate views according to the claimed isolation level. Divergence between the views indicates an isolation bug; Troc detected new isolation bugs in MySQL, MariaDB and TiDB [8].	https://doi.org/10.1109/ICSE43902.2023.00150

Year	Conference/ Journal	Paper Title	Category	Abstract	Link
2025	ISSTA 2025	Detecting Isolation Anomalies in Relational DBMSs	Execution history verification	IsoRel is a novel black-box isolation checker that supports relational data models and complex SQL. It records the data rows accessed by each SQL statement using auxiliary columns, constructs transaction dependency graphs and identifies isolation anomalies. Evaluations on five DBMSs discovered 48 unique anomalies [9].	https://doi.org/10.1145/3728953

Year	Conference/ Journal	Paper Title	Category	Abstract	Link
2025	PVLDB 2025 (preprint)	TxnSails: Achieving Serializable Transaction Scheduling with Self-Adaptive Isolation Level Selection	Client program robustness verification	TxnSails is a middle-tier solution that achieves serializable scheduling with self-adaptive isolation level selection. It unifies concurrency control to achieve serializability at lower isolation levels, employs deep learning to balance performance benefits against overhead and uses cross-isolation validation to ensure serializability. Experiments show up to 26.7× speedups over state-of-the-art solutions [10].	https://arxiv.org/abs/2502.00991

[1] [2503.06284] VerIso: Verifiable Isolation Guarantees for Database Transactions
https://arxiv.org/abs/2503.06284

[2] On the Complexity of Checking Mixed Isolation Levels for SQL Transactions | SpringerLink
https://link.springer.com/chapter/10.1007/978-3-031-98685-7_15

[3] Pushing the Limit: Verified Performance-Optimal Causally-Consistent Database Transactions | SpringerLink
https://link.springer.com/chapter/10.1007/978-3-031-90660-2_3

[4] Plume: Efficient and Complete Black-box Checking of Weak Isolation Levels (SPLASH 2024 - OOPSLA 2024) - SPLASH 2024
https://2024.splashcon.org/details/splash-2024-oopsla/85/Plume-Efficient-and-Complete-Black-box-Checking-of-Weak-Isolation-Levels

5 [2504.15036] Dynamic Robustness Verification Against Weak Memory (Extended Version)
https://arxiv.org/abs/2504.15036

6 [2503.05163] Vbox: Efficient Black-Box Serializability Verification
https://arxiv.org/abs/2503.05163

7 Understanding Transaction Bugs in Database Systems (ICSE 2024 - Research Track) - ICSE 2024
https://conf.researchr.org/details/icse-2024/icse-2024-research-track/207/Understanding-Transaction-Bugs-in-Database-Systems

8 Detecting Isolation Bugs via Transaction Oracle Construction (ICSE 2023 - Technical Track) - ICSE 2023
https://conf.researchr.org/details/icse-2023/icse-2023-technical-track/74/Detecting-Isolation-Bugs-via-Transaction-Oracle-Construction

9 Detecting Isolation Anomalies in Relational DBMSs (ISSTA 2025 - Research Papers) - ISSTA 2025
https://conf.researchr.org/details/issta-2025/issta-2025-papers/75/Detecting-Isolation-Anomalies-in-Relational-DBMSs

10 [2502.00991] TxnSails: Achieving Serializable Transaction Scheduling with Self-Adaptive Isolation Level Selection
https://ar5iv.labs.arxiv.org/html/2502.00991