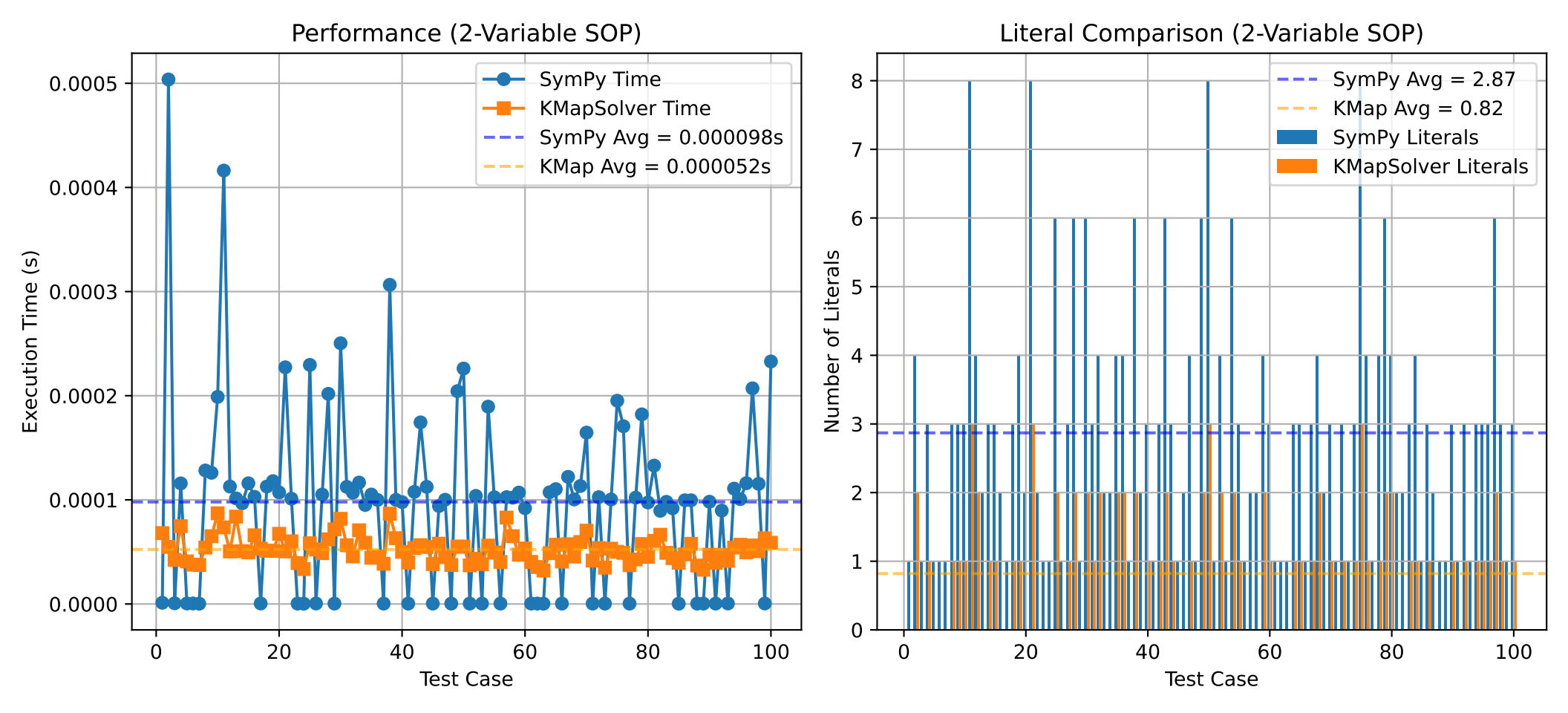
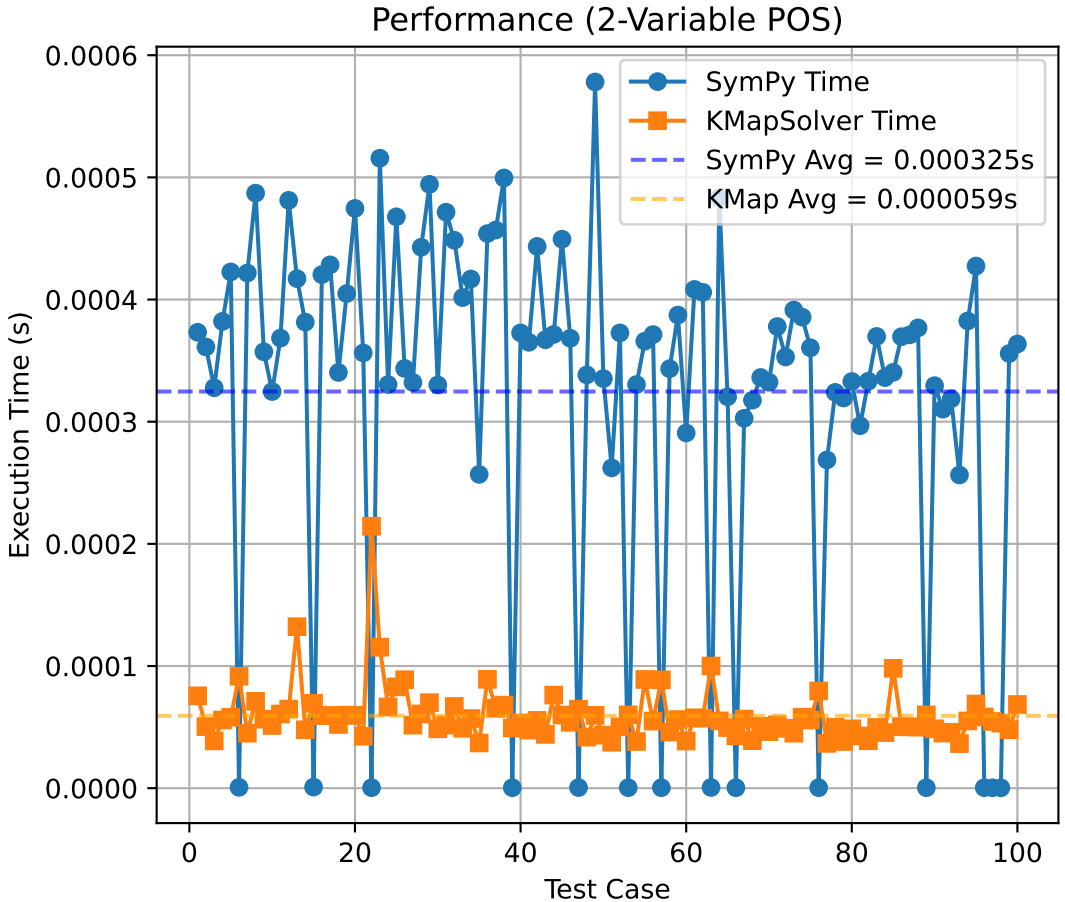
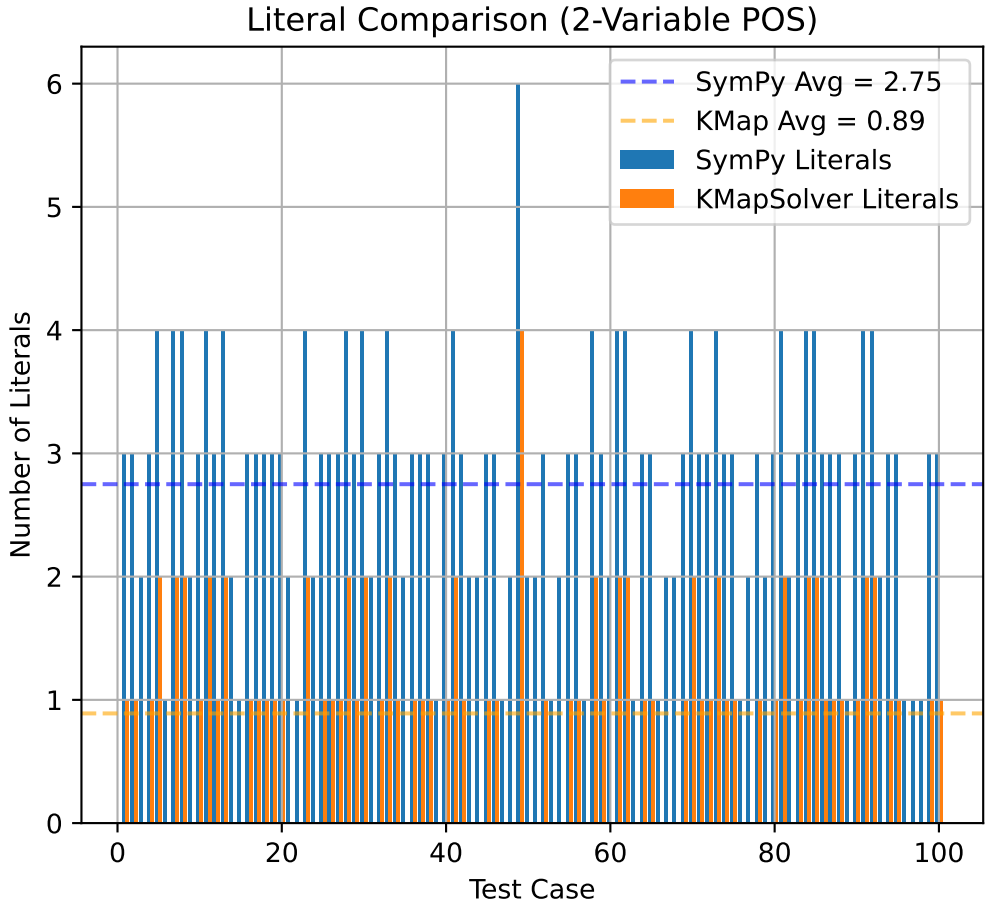
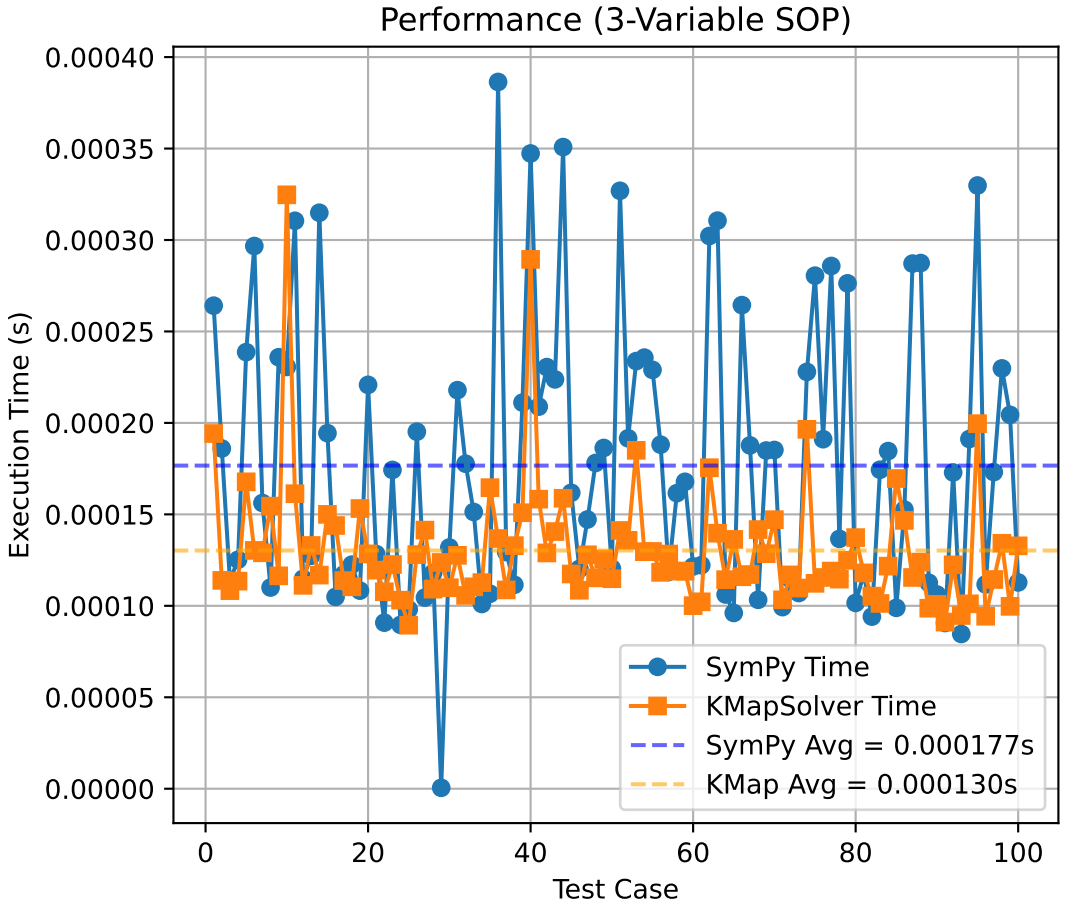
Inference Report

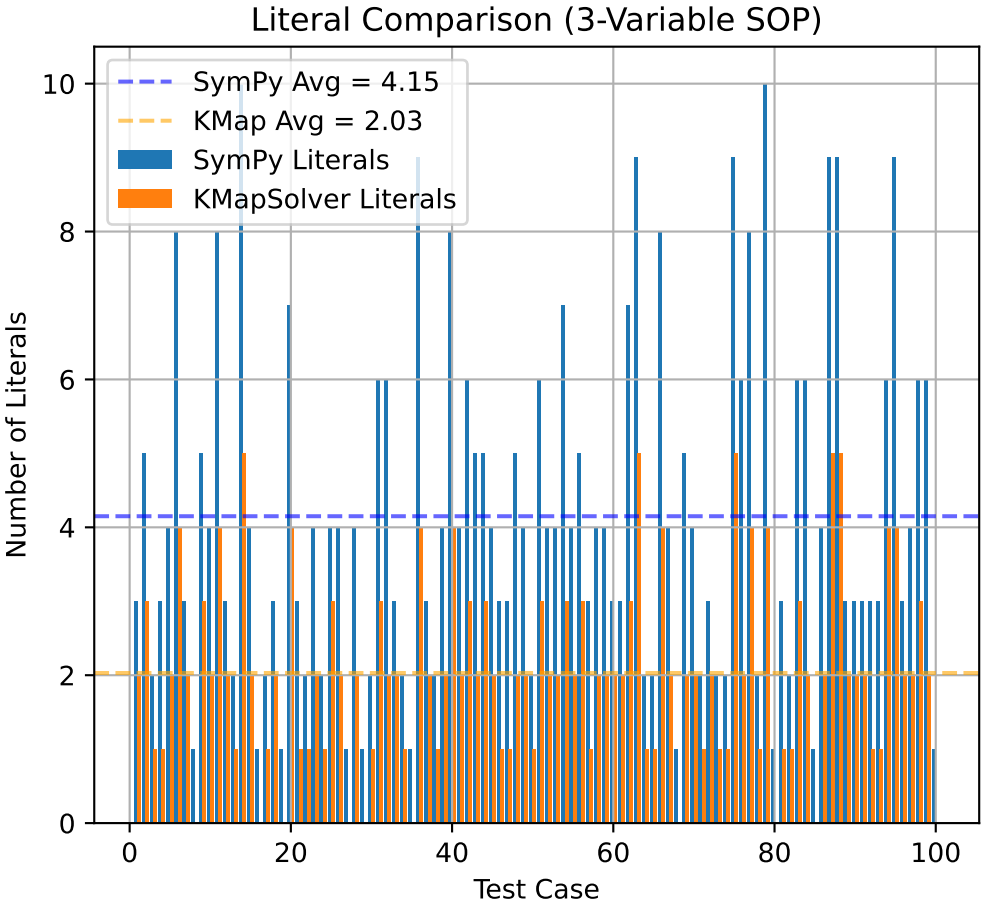
Performance and Simplification Benchmark between SymPy and KMapSolver

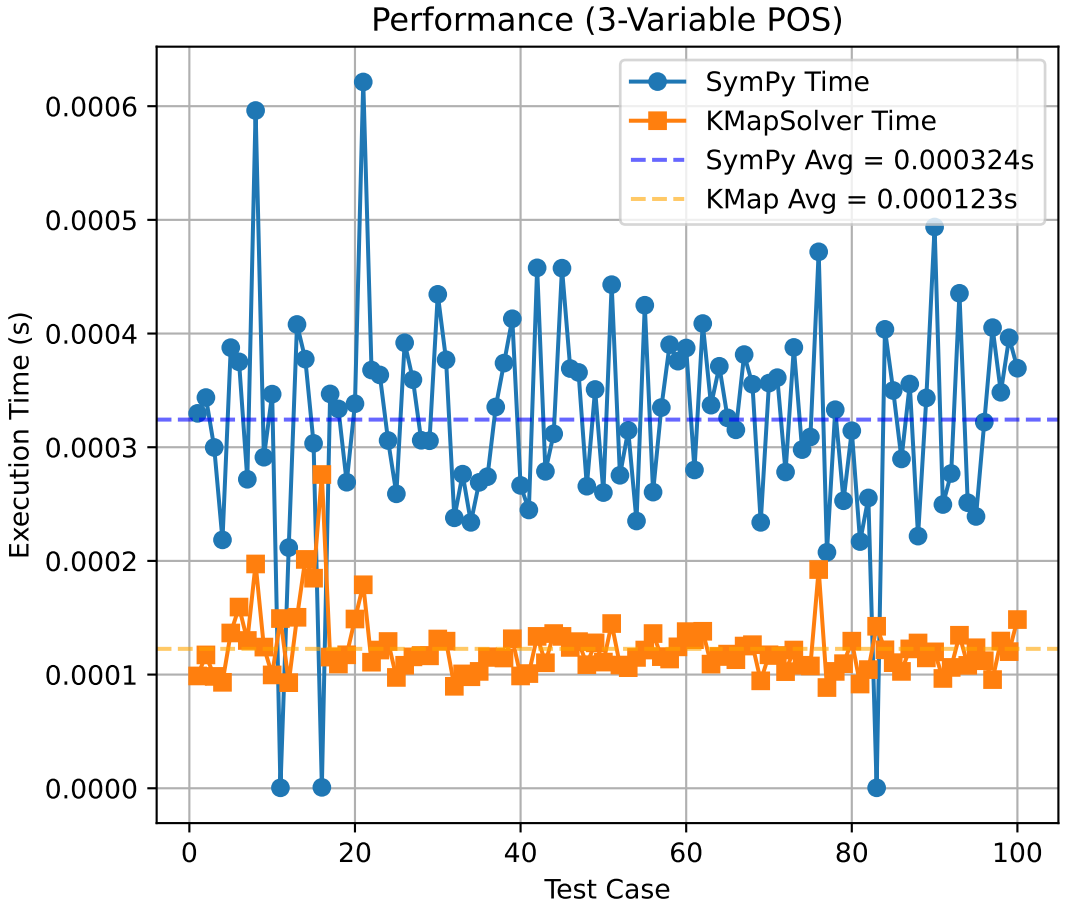

Performance (2-Variable SOP)
SymPy Time
KMapSolver Time
SymPy Avg = 0.000098s
KMap Avg = 0.000052s
Execution Time (s)
0.0000
0.0001
0.0002
0.0003
0.0004
0.0005
0
20
40
60
80
100
Test Case
Literal Comparison (2-Variable SOP)
SymPy Avg = 2.87
KMap Avg = 0.82
SymPy Literals
KMapSolver Literals
Number of Literals
0
1
2
3
4
5
6
7
8
0
20
40
60
80
100
Test Case

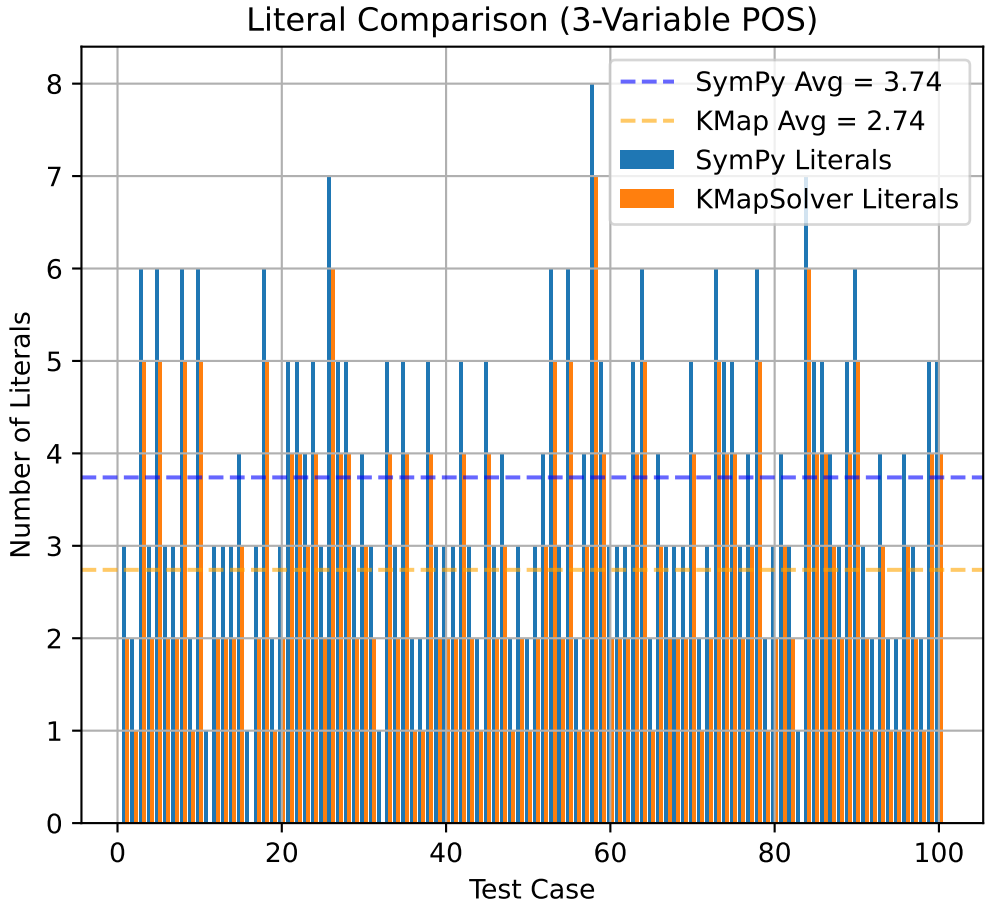

Performance (2-Variable POS)
SymPy Time
KMapSolver Time
SymPy Avg = 0.000325s
KMap Avg = 0.000059s
Execution Time (s)
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
0
20
40
60
80
100
Test Case

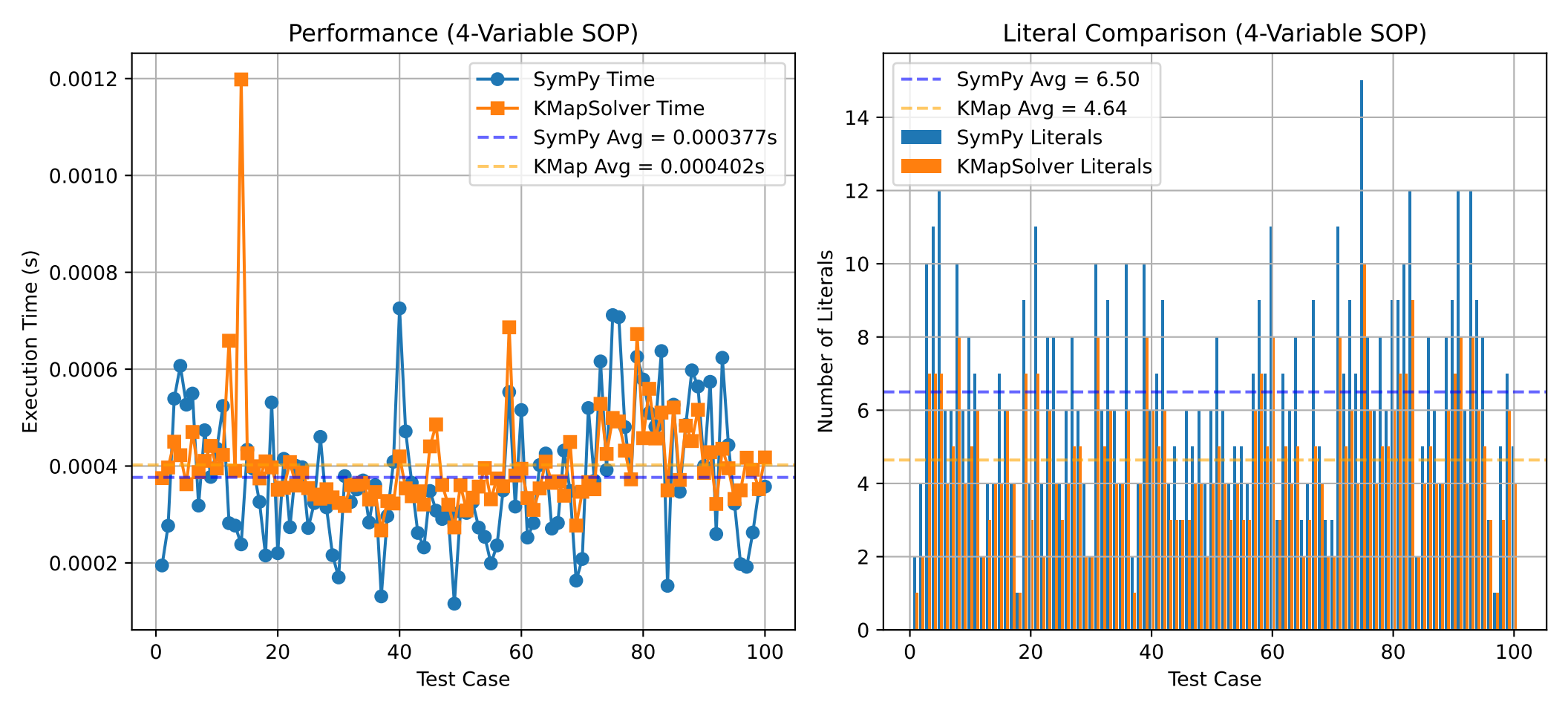

Literal Comparison (2-Variable POS)
SymPy Avg = 2.75
KMap Avg = 0.89
SymPy Literals
KMapSolver Literals
Number of Literals
6
5
4
3
2
1
0
0
20
40
60
80
100
Test Case

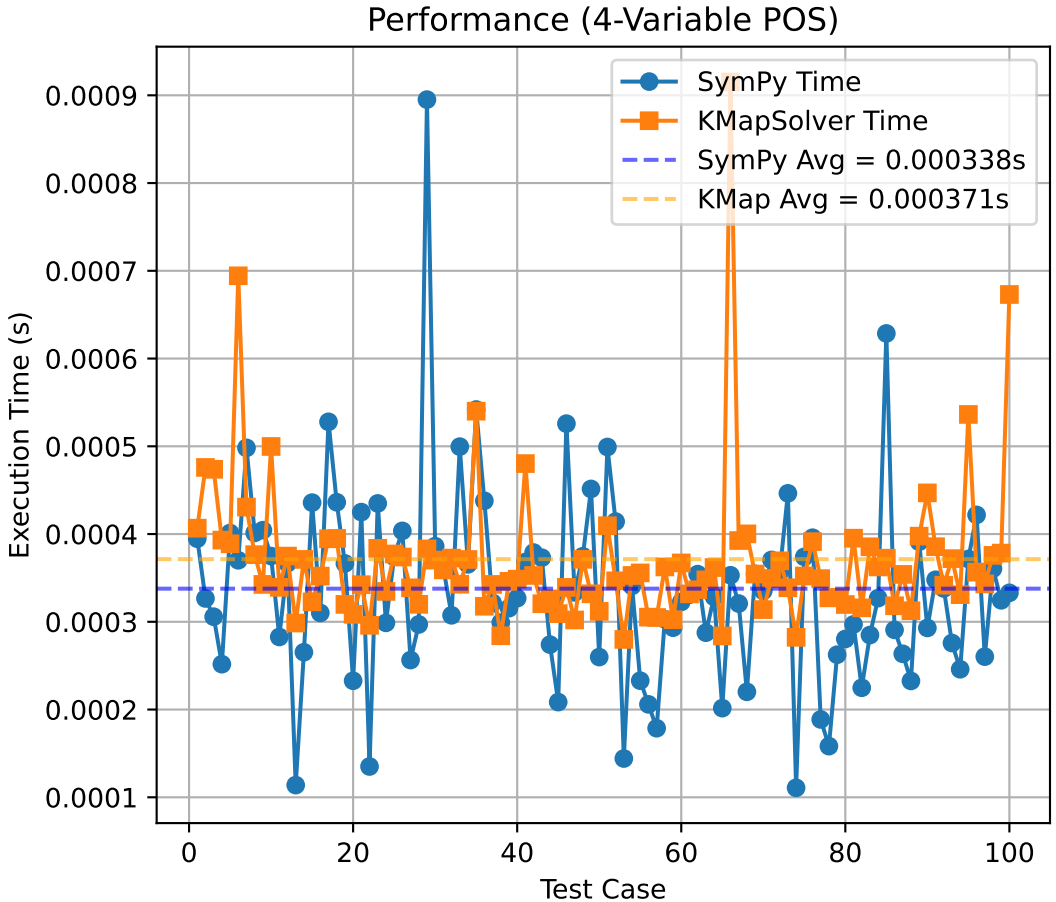

Performance (3-Variable SOP)
Execution Time (s)
0.00040
0.00035
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
0
20
40
60
80
100
Test Case
SymPy Time
KMapSolver Time
SymPy Avg = 0.000177s
KMap Avg = 0.000130s

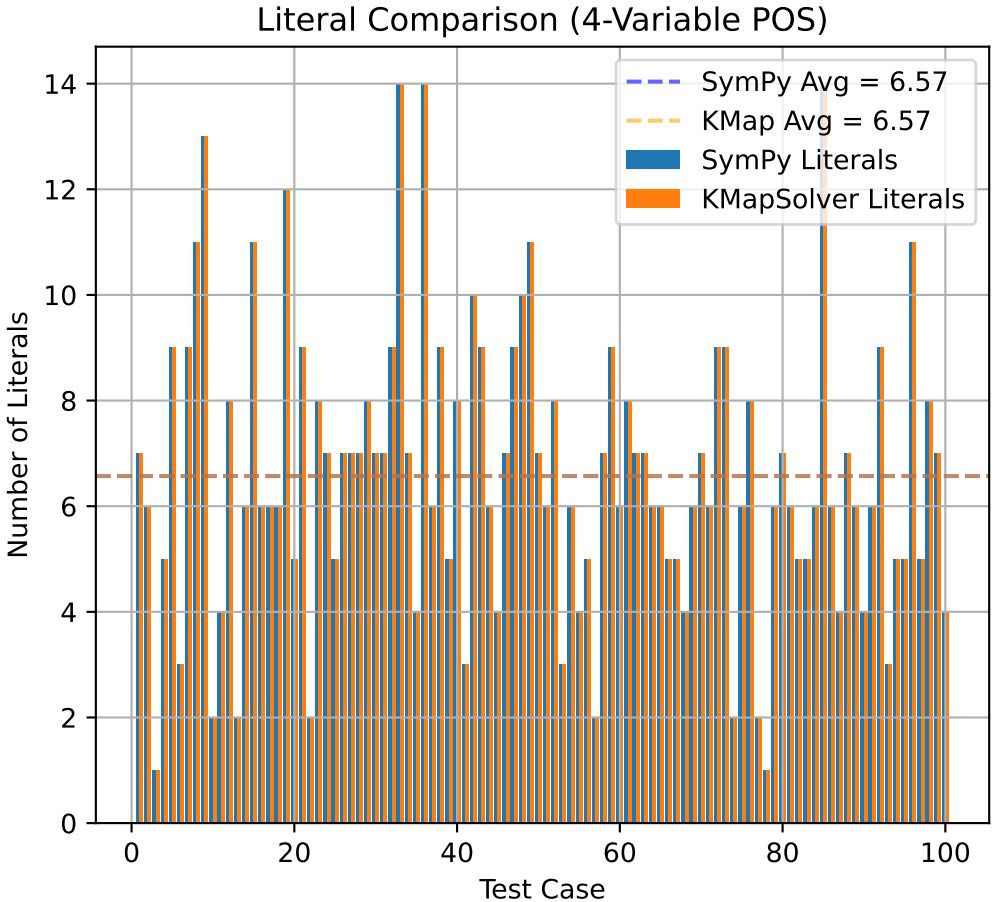

Literal Comparison (3-Variable SOP)
Number of Literals
10
8
6
4
2
0
0
20
40
60
80
100
Test Case
SymPy Avg = 4.15
KMap Avg = 2.03
SymPy Literals
KMapSolver Literals

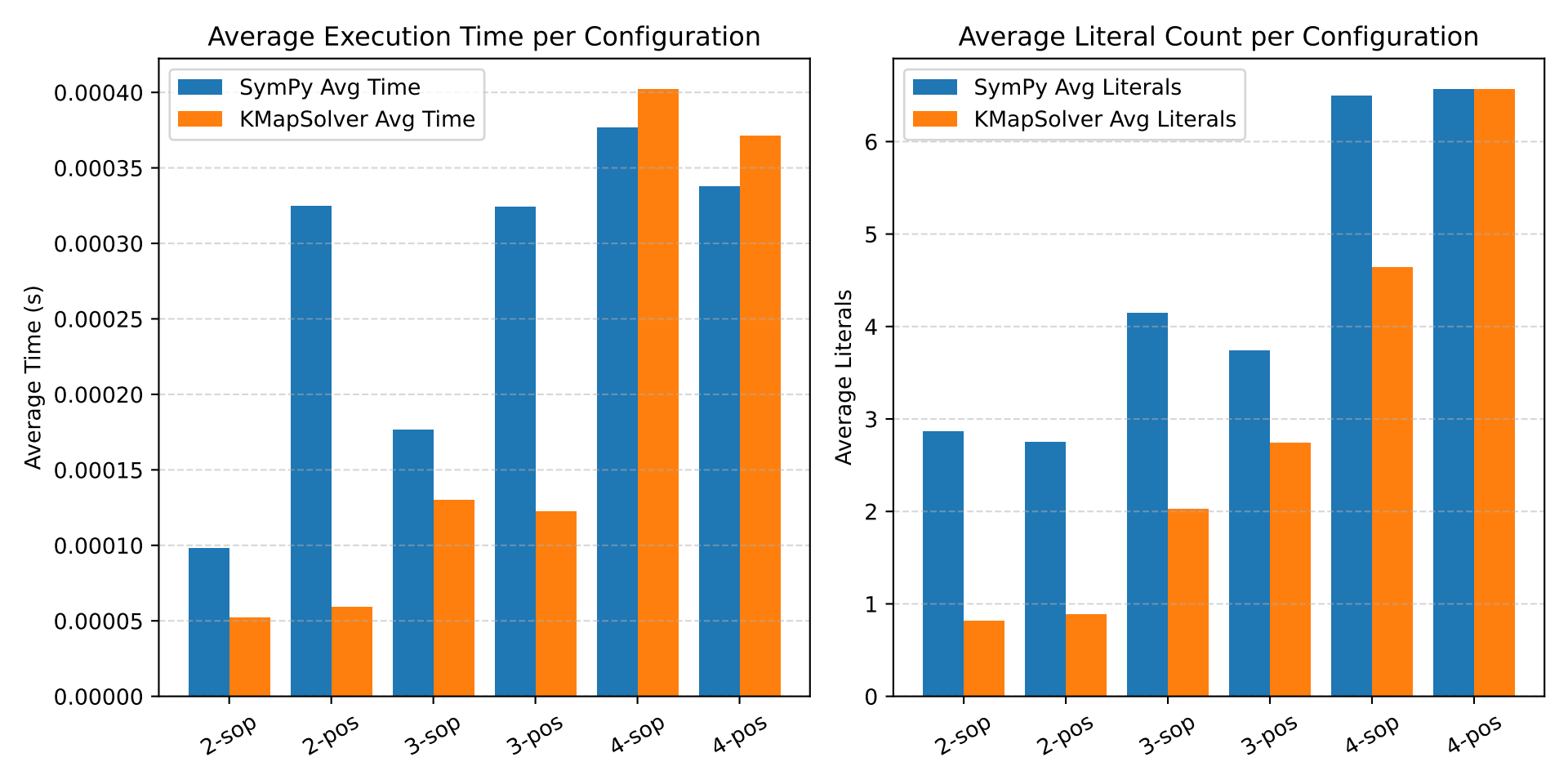

Performance (3-Variable POS)
SymPy Time
KMapSolver Time
SymPy Avg = 0.000324s
KMap Avg = 0.000123s
Execution Time (s)
0.0000
0.0001
0.0002
0.0003
0.0004
0.0005
0.0006
0
20
40
60
80
100
Test Case


Literal Comparison (3-Variable POS)
SymPy Avg = 3.74
KMap Avg = 2.74
SymPy Literals
KMapSolver Literals
Number of Literals
0
1
2
3
4
5
6
7
8
0
20
40
60
80
100
Test Case


Performance (4-Variable SOP)
SymPy Time
KMapSolver Time
SymPy Avg = 0.000377s
KMap Avg = 0.000402s
Execution Time (s)
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0
20
40
60
80
100
Test Case
Literal Comparison (4-Variable SOP)
SymPy Avg = 6.50
KMap Avg = 4.64
SymPy Literals
KMapSolver Literals
Number of Literals
14
12
10
8
6
4
2
0
0
20
40
60
80
100
Test Case


Performance (4-Variable POS)
SymPy Time
KMapSolver Time
SymPy Avg = 0.000338s
KMap Avg = 0.000371s
Execution Time (s)
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
20
40
60
80
100
Test Case


Literal Comparison (4-Variable POS)
SymPy Avg = 6.57
KMap Avg = 6.57
SymPy Literals
KMapSolver Literals
Number of Literals
14
12
10
8
6
4
2
0
0
20
40
60
80
100
Test Case


Average Execution Time per Configuration
SymPy Avg Time
KMapSolver Avg Time
Average Time (s)
0.00000
0.00005
0.00010
0.00015
0.00020
0.00025
0.00030
0.00035
0.00040
2-sop
2-pos
3-sop
3-pos
4-sop
4-pos
Average Literal Count per Configuration
SymPy Avg Literals
KMapSolver Avg Literals
Average Literals
0
1
2
3
4
5
6
2-sop
2-pos
3-sop
3-pos
4-sop
4-pos

INFERENCE REPORT

Generated on October 29, 2025

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================================================================================ INFERENCE
================================================================================  EXECUTIO
ANALYSIS   Average SymPy Time:      0.000273 s   Average KMapSolver Time: 0.000190 s
Difference:              -0.000083 s (-30.51%)   Std. Dev (ΔTime):        0.000123 s
Deviation Ratio:         0.450   → KMapSolver is faster than SymPy on average.   → Ex
times are stable and consistent.  LITERAL COUNT ANALYSIS   Average SymPy Literals:  4
Average KMap Literals:   2.95   Difference:              -1.48 (-33.4%)   Std. Dev (Δ
0.83   Deviation Ratio:         0.187   → KMapSolver produces more minimal logical fo
literals).   → Literal simplifications are consistent.  OVERALL VERDICT   □ KMapSolve
comparable or superior simplification efficiency with minimal time overhead.
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