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class Clause:
def __init__(self, literals):
self.literals = set(literals)
def __str__(self):
....return "'V'".join(sorted(self.literals))
def __eq__(self, other):
return self.literals == other.literals
def __hash__(self):
return hash(frozenset(self.literals))
def negate(literal):
if literal.startswith('¬'):
return literal[1:] # Remove negation
····else:
·····return '¬' + literal # Add negation
def resolve(clause1, clause2):
resolvents = []
for literal in clause1.literals:
if negate(literal) in clause2.literals:
new_clause = (clause1.literals | clause2.literals) - {literal, negate(literal)}
resolvents.append(Clause(new_clause))
···return resolvents
def resolution(clauses, query):
····# Negate the query
negated query = negate(query)
clauses.append(Clause([negated_query]))
new_clauses = set(clauses)
...while True:
pairs == [(c1, c2) for i, c1 in enumerate(new_clauses) for c2 in list(new_clauses)[i+1:]]
resolvents = set()
for c1, c2 in pairs:
resolvents = resolve(c1, c2)
new_resolvents.update(resolvents)
***** # If we derive an empty clause, the original set entails the query
·····if Clause(set()) in new_resolvents:
····True
*** ** Add new resolvents to the set of clauses
new_clauses.update(new_resolvents)
***** #*If no new clauses are generated, we stop
....if new_resolvents.issubset(new_clauses):
····break
···return False
# Example usage
if __name__ == "__main__":
* * * Define some clauses
····clauses·=·[
·····Clause(['A', 'B']),
.....Clause(['¬A', 'C']),
······Clause(['¬B', ·'¬C']),
• • • • ]
... # Query to resolve
····query·=·'C'
* * * # Perform resolution
result = resolution(clauses, query)
--- print(f"The query '{query}' is {'entailed' if result else 'not entailed'} by the clauses.")
→ The query 'C' is not entailed by the clauses.
```