3×3 Knight's Tour, p. 204-209

① $\forall X \; path(X, X)$

② $\forall X, Y \; [path(X,Y) \leftarrow \exists Z \; [move(X,Z) \wedge path(Z,Y)]]$

Using $\forall X, Y \; (\exists Z \; P \rightarrow Q) \equiv \forall X, Y, Z \; (P \rightarrow Q)$ if Z does not occur in Q

Rewrite ② as:

②' $\forall X, Y, Z \; [path(X,Y) \leftarrow [move(X,Z) \wedge path(Z,Y)]]$

Using $\forall X P$ iff P, drop quantifiers, giving

Ⅰ $path(X,X)$

Ⅱ $path(X,Y) \leftarrow [move(X,Z) \wedge path(Z,Y)]$

Goal: $path(1,2)$

Unify with Ⅱ by $\{1/X, 2/Y\}$, giving

$path(1,2) \leftarrow [move(1,Z) \wedge path(Z,2)]$

Subgoal: $move(1,Z)$

Unify with fact $move(1,8)$ by $\{8/Z\}$, satisfying this subgoal and giving new

Subgoal: $path(8,2)$.

Unify with Ⅱ by $\{8/X, 2/Y\}$, giving

$path(8,2) \leftarrow move(8,Z) \wedge path(Z,2)$

Subgoal: $move(8,Z)$

Unify with fact $move(8,3)$ by $\{3/Z\}$ satisfying this subgoal and giving new

Subgoal: $path(3,2)$

Unify with Ⅱ by $\{3/X, 2/Y\}$, giving

$path(3,2) \leftarrow move(3,Z) \wedge path(Z,2)$

Subgoal: $move(3,Z)$

Unify with fact move(3,4) by {4/z}
satisfying this subgoal and giving new
Subgoal: path(4,2)
Unify with (II) by {4/x, 2/y}, giving
path(4,2) ← move(4,z) ∧ path(z,2)
Subgoal: move(4,z)
Unify with fact move(4,9) by {9/z}
satisfying this subgoal and giving new
Subgoal: path(9,2)
Unify with (II) by {9/x, 2/y}, giving
path(9,2) ← move(9,z) ∧ path(z,2)
Subgoal: move(9,z)
Unify with fact move(9,2) by {2/z}
satisfying this subgoal and giving new
Subgoal: path(2,2)
Unify with (I) by {2/x}, satisfying this subgoal.
All unsatisfied subgoals now become satisfied in reverse order,
ultimately satisfying the initial goal path(1,2).
So the answer to the query path(1,2), is "yes".