This paper studys the model checking problem of the push-down multi-agent system for the ATL specification.

This paper introdeces a multi-agent pushdown game structure to simulate more situations involving infinite states (caused by recursive structures), and several agents can cooperate or act in a hostile manner to achieve a specific goal. As a major contribution related to these structures, we have introduced and studied the model checking problem of logic ATL and showed that this problem can be solved in 3EXPTIME.

First Paper introduces the PGS and provide an example to help clarify the settings.

Second paper reviews the syntax and semantics of ATL on CGS and define the model checking problem for ATL on PGS.

Third paper proves that the latter can be solved by the automaton theory in 3EXPTIME and also demonstrated the 2EXPSPACE-hard lower bound.

Finally summarize the achievements and discuss some future work.