Abstract. GP2 is a graph transformation rule-based graph program- ming language that facilitates analysis and verification of programs. Ver- ification of a graph program with GP2 can be done with formal proof in first-order or monadic second-order logic. The process of verifying a graph program tends to be complex if it is done manually. This paper dis- cusses the result of the preliminary analysis of the utilization of Isabelle as a proof assistant to help show the validity of a graph program. This study aims to see how much Isabelle can be used as a proof assistant to verify a graph program in GP2. Experimental results show that complex theory is one of the factors in Isabelle's failure to prove certain proper- ties. The research results show that Isabelle can verify some properties for graph program verification, but it is limited to certain theories.

Keywords: GP2, graph program, Isabelle, proof assistant