# *ABSTRACT*

*The rapid development of information and communication technology has driven an increase in the need for reliable internet connectivity, especially in high-mobility conditions. Mobility in wireless networks requires efficient handover mechanisms to maintain the quality of data communication services. The Mobile IPv6 (MIPv6) and Hierarchical Mobile IPv6 (HMIPv6) protocols are two protocols developed to support user mobility in IP networks. The objective of this thesis is to analyze and compare the performance of MIPv6 and HMIPv6 during the handover process in a mobile network, specifically regarding changes in the number of Mobile Nodes (MN) from 1 to 10 nodes. The simulation was conducted using OMNeT++ software with the INET framework. The evaluation parameters used include packet loss, throughput, and delay.*

*The simulation results show that increasing the number of MNs from 1 to 10 causes a spike in average packet loss, from 17.10% to 81.97% for MIPv6, and from 5.60% to 82.00% for HMIPv6. However, throughput remains stable at an average of 107.83 Mbps for MIPv6 and 107.54 Mbps for HMIPv6 in the MN 10 scenario. Delay values for both protocols are identical as they are manually set within the range of 100–1000 ms. Although MIPv6 is slightly superior in terms of packet loss and throughput, HMIPv6 demonstrates architectural advantages due to its ability to handle handover locally through the Mobility Anchor Point (MAP). Therefore, HMIPv6 is considered more suitable for use in high-mobility network scenarios with a high density of nodes.*



***Keywords:*** *MIPv6, HMIPv6, handover, mobile network, OMNeT++, packet loss, throughput, delay.*