

LIST OF FIGURES

| | |
|--|----|
| Figure 2. 1 MANET Scenario [2] | 5 |
| Figure 2. 2 VDTN Scenario [1] | 6 |
| Figure 2. 3 VDTN Layered Architecture [1] | 7 |
| Figure 2. 4 The MaxProp Routing Strategy [2] | 9 |
| Figure 2. 5 Mobility Model Taxonomy [12]..... | 10 |
| Figure 2. 6 Freeway Mobility Model [12] | 10 |
| Figure 2. 7 Clustering Taxonomy [12]..... | 12 |
| Figure 2. 8 NS-2 Basic Architecture [19] | 13 |
| Figure 3. 1 Cipularang Highway Toll Map..... | 14 |
| Figure 3. 2 Route Discovery Process | 17 |
| Figure 3. 3 Route Maintenance Process..... | 18 |
| Figure 3. 4 Black Hole Attack Scenario | 18 |
| Figure 3. 5 AODV with IDS Route Discovery Mechanism | 20 |
| Figure 3. 6 AODV with IDS Route Maintenance Mechanism | 21 |
| Figure 3. 7 Research's flow chart | 22 |
| Figure 3. 8 Simulation Flow Chart..... | 23 |
| Figure 3. 9 Examples of scatter diagrams with different values of correlation coefficient ρ | 26 |
| Figure 4. 1 Throughput Simulation Results..... | 29 |
| Figure 4. 2 Throughput This Research vs Previous Research | 30 |
| Figure 4. 3 Packet Loss Simulation Results..... | 31 |
| Figure 4. 4 Packet Loss This Research vs Previous Research | 32 |
| Figure 4. 5 End to End Delay Simulation Results | 32 |
| Figure 4. 6 Delay This Research vs Previous Research..... | 33 |
| Figure 4. 7 NLR Summary..... | 34 |
| Figure 4. 8 NRL Previous Research vs This Research | 35 |
| Figure 4. 9 Pearson's Correlation Coefficient for Throughput vs Packet Loss..... | 36 |
| Figure 4. 10 Kendall's Correlation Coefficient for Throughput vs Packet Loss | 36 |
| Figure 4. 11 Pearson's Correlation Coefficient for Throughput vs End to End Delay | 38 |
| Figure 4. 12 Kendall's Correlation Coefficient for Throughput vs End to End Delay | 38 |
| Figure 4. 13 Pearson's Correlation Coefficient for Throughput vs NRL | 39 |
| Figure 4. 14 Kendall's Correlation Coefficient for Throughput vs NRL | 39 |
| Figure 4. 15 Pearson's Correlation Coefficient for Packet Loss vs End to End Delay | 41 |
| Figure 4. 16 Kendall's Correlation Coefficient for Packet Loss vs End to End Delay | 41 |
| Figure 4. 17 Pearson's Correlation Coefficient for Packet Loss vs NRL | 42 |
| Figure 4. 18 Kendall's Correlation Coefficient for Packet Loss vs NRL | 42 |

| | |
|---|----|
| Figure 4. 19 Pearson's Correlation Coefficient for End to End Delay vs NRL..... | 44 |
| Figure 4. 20 Kendall's Correlation Coefficient for End to End Delay vs NRL..... | 44 |