

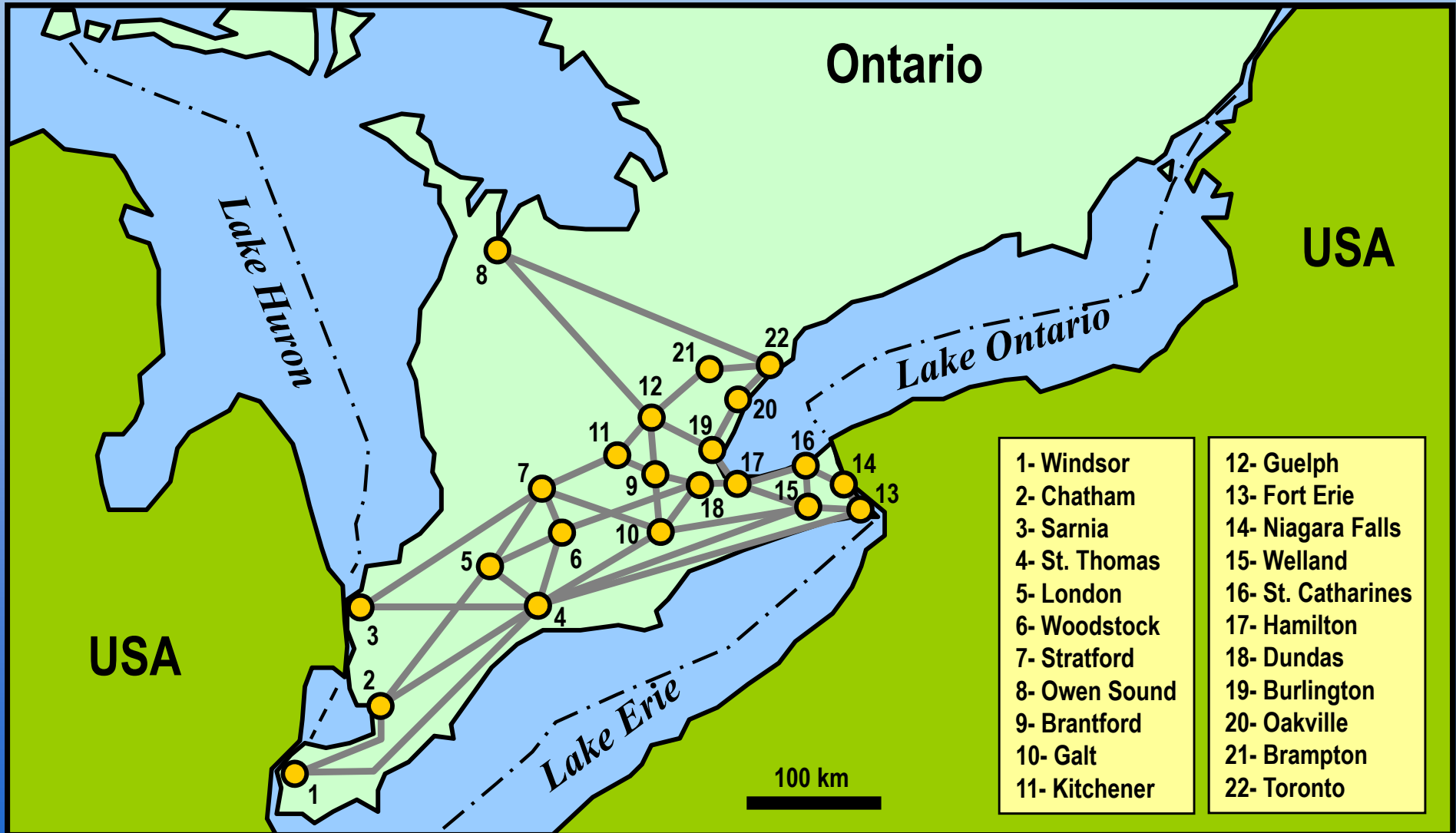
Osobní železnice v jižním Ontariu

Jan Drbůšek, Boris Hůlka,
Lukáš Vrabec, Petr Voda

Úkol

1. Matrice topologických vzdáleností (Shimbelova matice)
 - min. počet hran potřebných ke spojení dvojice vrcholů
2. Výpočet Shimbelova indexu
 - sumace počtu hran ke spojení se všemi ostatními vrcholy
 - nalezení topologicky nejlépe / nejhůře dostupných vrcholů
3. Výpočet indexů a jejich interpretace
 - míry konektivity grafu, vyšší hodnota → růst konektivity
 - alfa index
 - počet cyklů ku maximálnímu možnému počtu cyklů
 - $\alpha = u / (2v - 5)$
 - beta index
 - počet hran ku počtu vrcholů
 - $\beta = e / v$
 - gama index
 - počet hran ku maximálnímu možnému počtu hran
 - $\gamma = e / 3(v - 2)$

1915

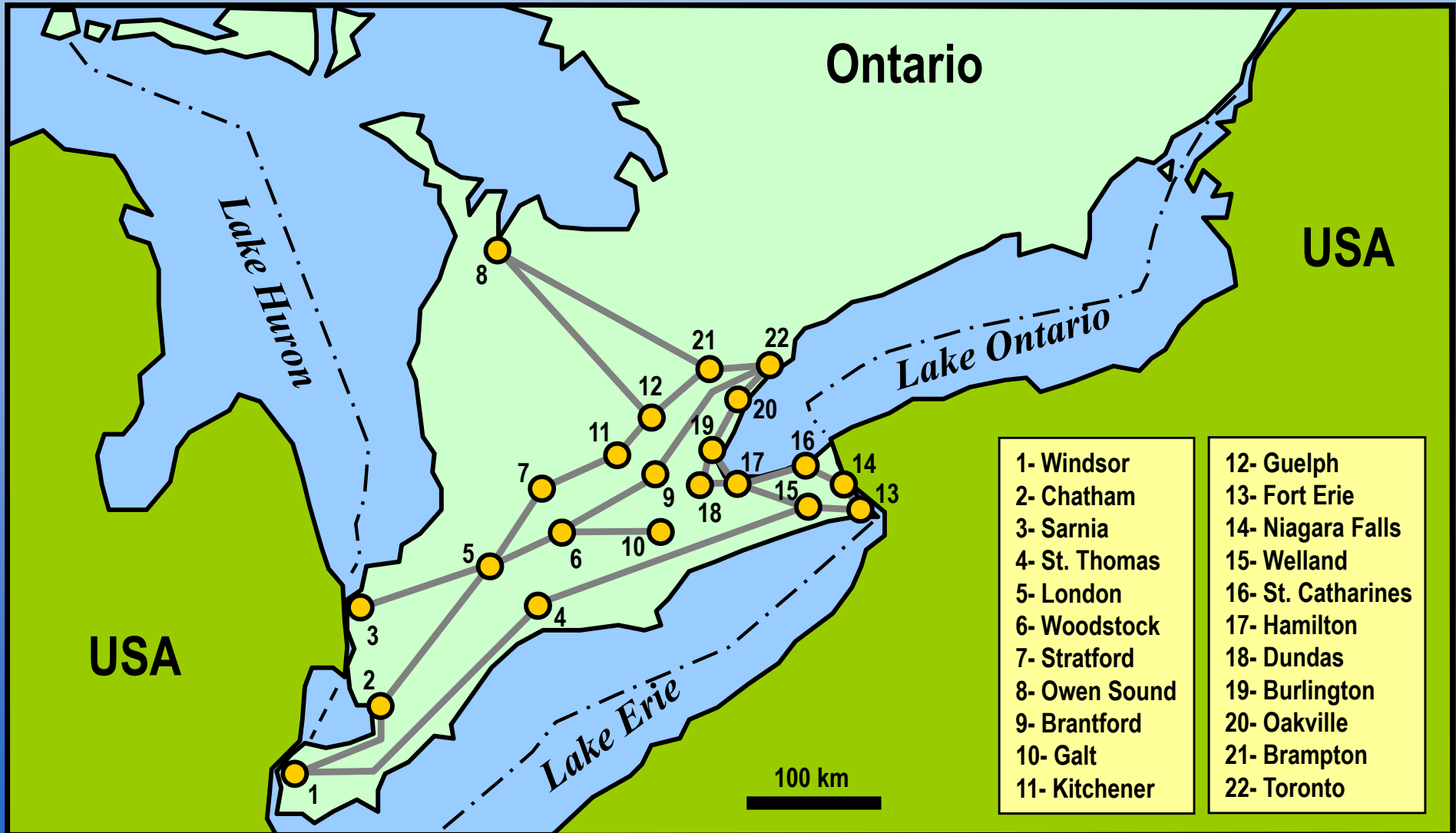


Shimbelova matice

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|
| 1 | 0 | 1 | 2 | 1 | 2 | 2 | 3 | 5 | 2 | 3 | 4 | 4 | 2 | 3 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 65 |
| 2 | 1 | 0 | 2 | 1 | 1 | 2 | 2 | 5 | 2 | 3 | 3 | 4 | 2 | 3 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 62 |
| 3 | 2 | 2 | 0 | 1 | 2 | 2 | 1 | 4 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 58 |
| 4 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 4 | 1 | 2 | 3 | 3 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 46 |
| 5 | 2 | 1 | 2 | 1 | 0 | 1 | 1 | 4 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 4 | 5 | 4 | 5 | 55 |
| 6 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 4 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 1 | 3 | 4 | 4 | 5 | 51 |
| 7 | 3 | 2 | 1 | 2 | 1 | 1 | 0 | 3 | 1 | 2 | 1 | 2 | 3 | 4 | 2 | 3 | 3 | 2 | 3 | 4 | 3 | 4 | 50 |
| 8 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 0 | 3 | 2 | 2 | 1 | 5 | 5 | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 68 |
| 9 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | 0 | 1 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 1 | 3 | 4 | 3 | 4 | 45 |
| 10 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 3 | 4 | 2 | 3 | 2 | 1 | 2 | 3 | 2 | 3 | 48 |
| 11 | 4 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 0 | 1 | 4 | 5 | 3 | 4 | 3 | 2 | 2 | 3 | 2 | 3 | 54 |
| 12 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 0 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 51 |
| 13 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 5 | 2 | 3 | 4 | 4 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 58 |
| 14 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 5 | 3 | 4 | 5 | 4 | 1 | 0 | 2 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 68 |
| 15 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 4 | 1 | 2 | 3 | 3 | 1 | 2 | 0 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 46 |
| 16 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 2 | 3 | 4 | 3 | 2 | 1 | 1 | 0 | 1 | 2 | 2 | 3 | 4 | 4 | 56 |
| 17 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 2 | 3 | 3 | 47 |
| 18 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 0 | 2 | 3 | 3 | 4 | 48 |
| 19 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 3 | 3 | 2 | 2 | 1 | 2 | 0 | 1 | 2 | 2 | 53 |
| 20 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 2 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 3 | 2 | 3 | 1 | 0 | 2 | 1 | 69 |
| 21 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 2 | 1 | 5 | 5 | 4 | 4 | 3 | 3 | 2 | 2 | 0 | 1 | 68 |
| 22 | 6 | 6 | 5 | 5 | 5 | 5 | 4 | 1 | 4 | 3 | 3 | 2 | 5 | 5 | 4 | 4 | 3 | 4 | 2 | 1 | 1 | 0 | 78 |
| | 65 | 62 | 58 | 46 | 55 | 51 | 50 | 68 | 45 | 48 | 54 | 51 | 58 | 68 | 46 | 56 | 47 | 48 | 53 | 69 | 68 | 78 | 1244 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1 | 0 | 48 | 172 | 109 | 124 | 142 | 154 | 271 | 169 | 155 | 179 | 193 | 219 | 234 | 209 | 221 | 189 | 174 | 194 | 205 | 220 | 227 | 3808 |
| 2 | 48 | 0 | 126 | 63 | 65 | 92 | 95 | 212 | 123 | 109 | 120 | 134 | 173 | 188 | 163 | 175 | 139 | 124 | 144 | 155 | 161 | 177 | 2786 |
| 3 | 172 | 126 | 0 | 61 | 78 | 96 | 77 | 194 | 123 | 109 | 102 | 116 | 173 | 188 | 163 | 175 | 146 | 131 | 144 | 155 | 143 | 161 | 2772 |
| 4 | 109 | 63 | 63 | 0 | 14 | 33 | 44 | 161 | 60 | 46 | 69 | 83 | 110 | 120 | 100 | 110 | 82 | 67 | 87 | 98 | 110 | 120 | 1749 |
| 5 | 124 | 65 | 78 | 14 | 0 | 27 | 30 | 147 | 60 | 61 | 55 | 69 | 125 | 140 | 115 | 127 | 67 | 52 | 72 | 83 | 96 | 105 | 1712 |
| 6 | 142 | 92 | 96 | 33 | 27 | 0 | 20 | 137 | 40 | 53 | 45 | 59 | 104 | 89 | 91 | 79 | 47 | 32 | 52 | 63 | 86 | 85 | 1472 |
| 7 | 154 | 95 | 77 | 44 | 30 | 20 | 0 | 117 | 50 | 64 | 25 | 39 | 130 | 139 | 117 | 129 | 73 | 58 | 78 | 89 | 66 | 84 | 1678 |
| 8 | 271 | 212 | 194 | 161 | 147 | 137 | 117 | 0 | 107 | 121 | 92 | 78 | 178 | 163 | 165 | 153 | 121 | 115 | 116 | 117 | 105 | 95 | 2965 |
| 9 | 169 | 123 | 123 | 60 | 60 | 40 | 50 | 107 | 0 | 14 | 25 | 29 | 80 | 65 | 67 | 55 | 23 | 8 | 28 | 39 | 56 | 61 | 1282 |
| 10 | 155 | 109 | 109 | 46 | 61 | 53 | 64 | 121 | 14 | 0 | 39 | 43 | 66 | 75 | 53 | 65 | 36 | 21 | 41 | 52 | 70 | 74 | 1367 |
| 11 | 179 | 120 | 102 | 69 | 55 | 45 | 25 | 92 | 25 | 39 | 0 | 14 | 104 | 89 | 92 | 79 | 47 | 33 | 42 | 53 | 41 | 59 | 1404 |
| 12 | 193 | 134 | 116 | 83 | 69 | 59 | 39 | 78 | 29 | 43 | 14 | 0 | 90 | 75 | 77 | 65 | 33 | 37 | 28 | 39 | 27 | 45 | 1373 |
| 13 | 219 | 173 | 173 | 110 | 125 | 104 | 130 | 178 | 80 | 66 | 104 | 90 | 0 | 15 | 13 | 25 | 57 | 72 | 62 | 73 | 113 | 95 | 2077 |
| 14 | 234 | 188 | 188 | 120 | 140 | 89 | 139 | 163 | 65 | 75 | 89 | 75 | 15 | 0 | 22 | 10 | 42 | 57 | 47 | 68 | 102 | 90 | 2018 |
| 15 | 209 | 163 | 163 | 100 | 115 | 91 | 117 | 165 | 67 | 53 | 92 | 77 | 13 | 22 | 0 | 12 | 44 | 59 | 49 | 60 | 100 | 82 | 1853 |
| 16 | 221 | 175 | 175 | 110 | 127 | 79 | 129 | 153 | 55 | 65 | 79 | 65 | 25 | 10 | 12 | 0 | 32 | 47 | 37 | 48 | 88 | 70 | 1802 |
| 17 | 189 | 139 | 146 | 82 | 67 | 47 | 73 | 121 | 23 | 36 | 47 | 33 | 57 | 42 | 44 | 32 | 0 | 15 | 5 | 16 | 56 | 38 | 1308 |
| 18 | 174 | 124 | 131 | 67 | 52 | 32 | 58 | 115 | 8 | 21 | 33 | 37 | 72 | 57 | 59 | 47 | 15 | 0 | 20 | 31 | 64 | 52 | 1269 |
| 19 | 194 | 144 | 144 | 87 | 72 | 52 | 78 | 116 | 28 | 41 | 42 | 28 | 62 | 47 | 49 | 37 | 5 | 20 | 0 | 11 | 50 | 32 | 1339 |
| 20 | 205 | 155 | 155 | 98 | 83 | 63 | 89 | 117 | 39 | 52 | 53 | 39 | 73 | 68 | 60 | 48 | 16 | 31 | 11 | 0 | 40 | 22 | 1517 |
| 21 | 220 | 161 | 143 | 110 | 96 | 86 | 66 | 105 | 56 | 70 | 41 | 27 | 113 | 102 | 100 | 88 | 56 | 64 | 50 | 40 | 0 | 18 | 1812 |
| 22 | 227 | 177 | 161 | 120 | 105 | 85 | 84 | 95 | 61 | 74 | 59 | 45 | 95 | 90 | 82 | 70 | 38 | 52 | 32 | 22 | 18 | 0 | 1792 |
| | 3808 | 2786 | 2835 | 1686 | 1712 | 1472 | 1678 | 2965 | 1282 | 1367 | 1404 | 1373 | 2077 | 2018 | 1853 | 1802 | 1308 | 1269 | 1339 | 1517 | 1812 | 1792 | 41155 |

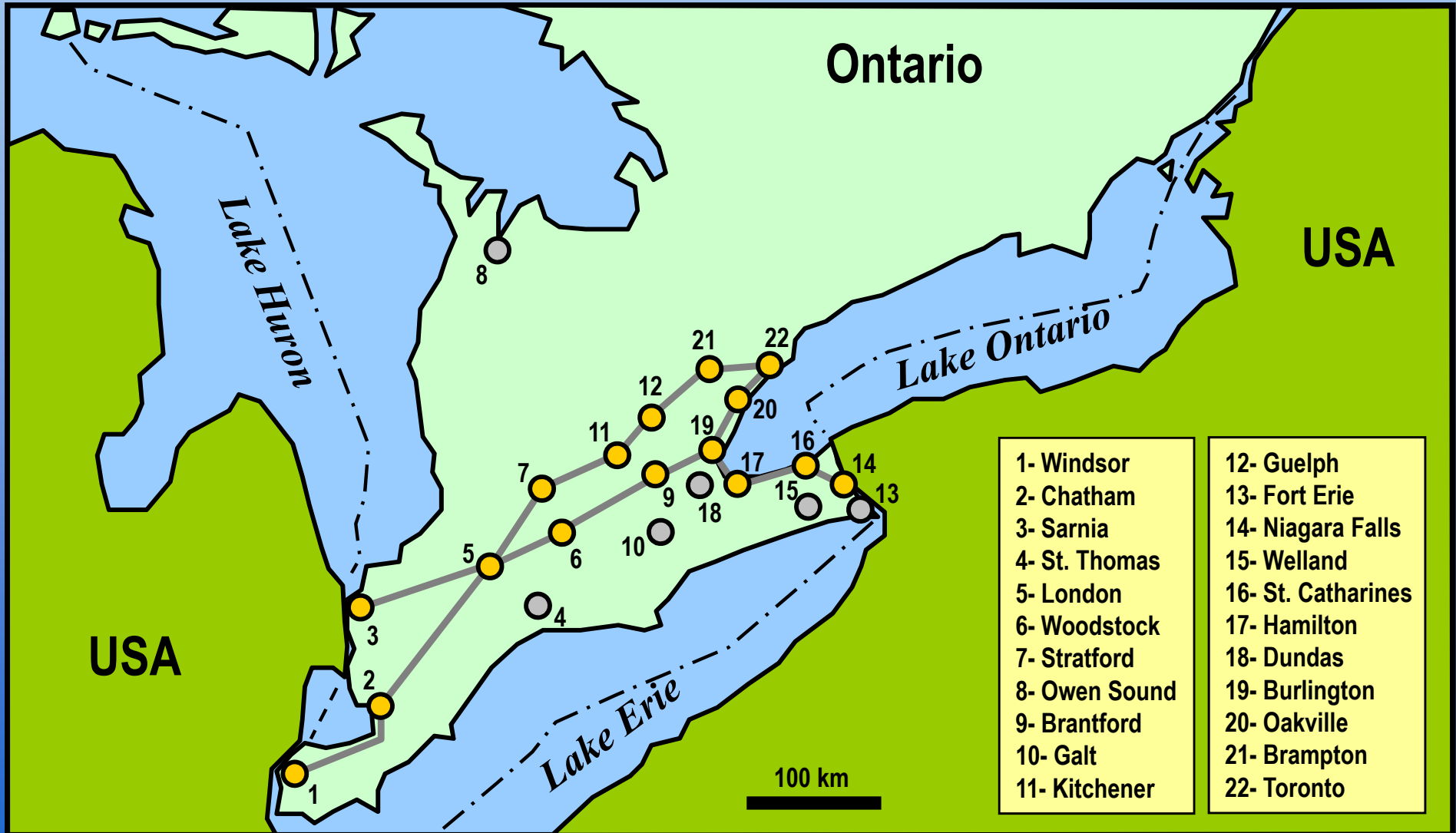
1966



Shimbelova matice

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|------|
| 1 | 0 | 1 | 3 | 1 | 2 | 3 | 3 | 6 | 4 | 4 | 4 | 5 | 3 | 4 | 2 | 4 | 3 | 4 | 4 | 5 | 6 | 5 | 76 |
| 2 | 1 | 0 | 2 | 2 | 1 | 2 | 2 | 5 | 3 | 3 | 3 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 73 |
| 3 | 3 | 2 | 0 | 4 | 1 | 2 | 2 | 5 | 3 | 3 | 3 | 4 | 6 | 7 | 5 | 7 | 6 | 7 | 6 | 5 | 5 | 4 | 90 |
| 4 | 1 | 2 | 4 | 0 | 3 | 4 | 4 | 7 | 5 | 5 | 5 | 6 | 2 | 3 | 1 | 3 | 2 | 3 | 3 | 4 | 6 | 5 | 78 |
| 5 | 2 | 1 | 1 | 3 | 0 | 1 | 1 | 4 | 2 | 2 | 2 | 3 | 5 | 6 | 4 | 6 | 5 | 6 | 5 | 4 | 4 | 3 | 70 |
| 6 | 3 | 2 | 2 | 4 | 1 | 0 | 2 | 4 | 1 | 1 | 3 | 4 | 6 | 7 | 5 | 6 | 5 | 5 | 4 | 3 | 3 | 2 | 73 |
| 7 | 3 | 2 | 2 | 4 | 1 | 2 | 0 | 3 | 3 | 3 | 1 | 2 | 6 | 7 | 5 | 7 | 6 | 7 | 6 | 5 | 3 | 4 | 82 |
| 8 | 6 | 5 | 5 | 7 | 4 | 4 | 3 | 0 | 3 | 5 | 2 | 1 | 7 | 7 | 6 | 6 | 5 | 5 | 4 | 3 | 1 | 2 | 91 |
| 9 | 4 | 3 | 3 | 5 | 2 | 1 | 3 | 3 | 0 | 2 | 4 | 3 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 1 | 71 |
| 10 | 4 | 3 | 3 | 5 | 2 | 1 | 3 | 5 | 2 | 0 | 4 | 4 | 7 | 8 | 6 | 7 | 6 | 6 | 5 | 4 | 4 | 3 | 92 |
| 11 | 4 | 3 | 3 | 5 | 2 | 3 | 1 | 2 | 4 | 4 | 0 | 1 | 7 | 8 | 6 | 7 | 6 | 6 | 5 | 4 | 2 | 3 | 86 |
| 12 | 5 | 4 | 4 | 6 | 3 | 4 | 2 | 1 | 3 | 4 | 1 | 0 | 7 | 7 | 6 | 6 | 5 | 5 | 4 | 3 | 1 | 2 | 83 |
| 13 | 3 | 4 | 6 | 2 | 5 | 6 | 6 | 7 | 6 | 7 | 7 | 7 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 6 | 5 | 93 |
| 14 | 4 | 5 | 7 | 3 | 6 | 7 | 7 | 7 | 6 | 8 | 8 | 7 | 1 | 0 | 2 | 1 | 2 | 3 | 3 | 4 | 6 | 5 | 102 |
| 15 | 2 | 3 | 5 | 1 | 4 | 5 | 5 | 6 | 5 | 6 | 6 | 6 | 1 | 2 | 0 | 2 | 1 | 2 | 2 | 3 | 5 | 4 | 76 |
| 16 | 4 | 5 | 7 | 3 | 6 | 6 | 7 | 6 | 5 | 7 | 7 | 6 | 2 | 1 | 2 | 0 | 1 | 2 | 2 | 3 | 5 | 4 | 91 |
| 17 | 3 | 4 | 6 | 2 | 5 | 5 | 6 | 5 | 4 | 6 | 6 | 5 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 2 | 4 | 3 | 74 |
| 18 | 4 | 5 | 7 | 3 | 6 | 5 | 7 | 5 | 4 | 6 | 6 | 5 | 3 | 3 | 2 | 2 | 1 | 0 | 1 | 2 | 4 | 3 | 84 |
| 19 | 4 | 5 | 6 | 3 | 5 | 4 | 6 | 4 | 3 | 5 | 5 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 1 | 3 | 2 | 72 |
| 20 | 5 | 5 | 5 | 4 | 4 | 3 | 5 | 3 | 2 | 4 | 4 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 0 | 2 | 1 | 69 |
| 21 | 6 | 5 | 5 | 6 | 4 | 3 | 3 | 1 | 2 | 4 | 2 | 1 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 2 | 0 | 1 | 78 |
| 22 | 5 | 4 | 4 | 5 | 3 | 2 | 4 | 2 | 1 | 3 | 3 | 2 | 5 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 0 | 66 |
| | 76 | 73 | 90 | 78 | 70 | 73 | 82 | 91 | 71 | 92 | 86 | 83 | 93 | 102 | 76 | 91 | 74 | 84 | 72 | 69 | 78 | 66 | 1770 |

2001



Shimbelova maticice

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
|----|----|----|----|---|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 0 | 1 | 3 | 0 | 2 | 3 | 3 | 0 | 4 | 0 | 4 | 5 | 0 | 8 | 0 | 7 | 6 | 0 | 5 | 6 | 6 | 7 | 70 |
| 2 | 1 | 0 | 2 | 0 | 1 | 2 | 2 | 0 | 3 | 0 | 3 | 4 | 0 | 7 | 0 | 6 | 5 | 0 | 4 | 5 | 5 | 6 | 56 |
| 3 | 3 | 2 | 0 | 0 | 1 | 2 | 2 | 0 | 3 | 0 | 3 | 4 | 0 | 7 | 0 | 6 | 5 | 0 | 4 | 5 | 5 | 6 | 58 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 2 | 3 | 0 | 6 | 0 | 5 | 4 | 0 | 3 | 4 | 4 | 5 | 44 |
| 6 | 3 | 2 | 2 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 | 3 | 0 | 5 | 0 | 4 | 3 | 0 | 2 | 3 | 4 | 4 | 41 |
| 7 | 3 | 2 | 2 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 7 | 0 | 6 | 5 | 0 | 4 | 5 | 3 | 4 | 50 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 4 | 3 | 3 | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 4 | 5 | 0 | 4 | 0 | 3 | 2 | 0 | 1 | 2 | 4 | 3 | 44 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 4 | 3 | 3 | 0 | 2 | 2 | 1 | 0 | 4 | 0 | 0 | 1 | 0 | 8 | 0 | 7 | 6 | 0 | 5 | 4 | 2 | 3 | 55 |
| 12 | 5 | 4 | 4 | 0 | 3 | 3 | 2 | 0 | 5 | 0 | 1 | 0 | 0 | 7 | 0 | 6 | 5 | 0 | 4 | 2 | 1 | 2 | 54 |
| 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 8 | 7 | 7 | 0 | 6 | 5 | 7 | 0 | 4 | 0 | 8 | 7 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 4 | 6 | 5 | 80 |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 7 | 6 | 6 | 0 | 5 | 4 | 6 | 0 | 3 | 0 | 7 | 6 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 3 | 5 | 4 | 66 |
| 17 | 6 | 5 | 5 | 0 | 4 | 3 | 5 | 0 | 2 | 0 | 6 | 5 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 2 | 4 | 3 | 54 |
| 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 5 | 4 | 4 | 0 | 3 | 2 | 4 | 0 | 1 | 0 | 5 | 4 | 0 | 3 | 0 | 2 | 1 | 0 | 0 | 1 | 3 | 2 | 44 |
| 20 | 6 | 5 | 5 | 0 | 4 | 3 | 5 | 0 | 2 | 0 | 4 | 2 | 0 | 4 | 0 | 3 | 2 | 0 | 1 | 0 | 2 | 1 | 49 |
| 21 | 6 | 5 | 5 | 0 | 4 | 4 | 3 | 0 | 4 | 0 | 2 | 1 | 0 | 6 | 0 | 5 | 4 | 0 | 3 | 2 | 0 | 1 | 55 |
| 22 | 7 | 6 | 6 | 0 | 5 | 4 | 4 | 0 | 3 | 0 | 3 | 2 | 0 | 5 | 0 | 4 | 3 | 0 | 2 | 1 | 1 | 0 | 56 |
| | 70 | 56 | 58 | 0 | 44 | 41 | 50 | 0 | 44 | 0 | 55 | 54 | 0 | 80 | 0 | 66 | 54 | 0 | 44 | 49 | 55 | 56 | 876 |

Výsledky

| | 1915 | 1966 | 2001 | 2001b |
|----------------|-------------|-------------|-------------|--------------|
| hrany (e) | 39 | 26 | 16 | 16 |
| vrcholy (v) | 22 | 22 | 16 | 22 |
| cyklické číslo | 18 | 5 | 1 | 1 |
| Alpha | 0,46 | 0,13 | 0,04 | 0,03 |
| Beta | 1,77 | 1,18 | 1,00 | 0,72 |
| Gamma | 0,65 | 0,43 | 0,38 | 0,27 |

Závěry

- Významné změny
 - Změny v dostupnosti míst v síti
 - Omezení počtu spojovaných měst i jejich spojnic
 - Výrazný pokles konektivity pomocí železnice v meziměstské dopravě
 - Problematický rok 2001
-
- kolaps systému a jeho restrukturalizace v druhé polovině 20. století