Clustering of Paths in Complex Networks
Supplementary Material*

Mareike Bockholt and Katharina A. Zweig

Table 1: Overview of the used data set. For each configuration, the size of the associated problem space is shown ($|V|$ and $|E|$ denote the number of nodes and edges of the problem space, $|V_{used}|$ denote the number of nodes which occur in at least one of the paths, % is the the percentage of used nodes), $\min|p|$ denotes the length of the optimal solution path. The remaining columns contain the information of how many paths are contained in the data set for each configuration and how many of them are solving and non-solving.

| Problem spaces | $|V|$ | $|V_{used}|$ | %  | $|E|$ | $\min|p|$ | Paths | Number of paths |
|----------------|-------|--------------|-----|------|---------|-------|------------------|
|                |       |              |     |      |         | total | solving | non-solving |
| Game 19        | 1169  | 153          | 13.01| 8620 | 31      | 662   | 213  | 449        |
| Game 64        | 2952  | 354          | 12.00| 21017| 5       | 2934  | 2592 | 342        |
| Game 121       | 4405  | 263          | 5.97 | 33032| 47      | 270   | 39   | 231        |
| Game 202       | 4635  | 171          | 3.69 | 38176| 41      | 359   | 89   | 270        |
| Game 246       | 3003  | 323          | 10.76| 22418| 33      | 552   | 158  | 394        |
| Game 260       | 3095  | 203          | 6.56 | 24919| 48      | 247   | 54   | 193        |
| Game 326       | 3493  | 175          | 5.01 | 27529| 50      | 290   | 48   | 242        |
| Game 357       | 4426  | 99           | 2.24 | 37649| 42      | 205   | 58   | 147        |
| Game 393       | 4533  | 244          | 5.38 | 30587| 49      | 175   | 53   | 122        |
| Game 441       | 4533  | 238          | 5.25 | 30587| 49      | 178   | 59   | 119        |
| Game 578       | 2853  | 257          | 9.01 | 24732| 31      | 904   | 230  | 674        |
| Game 579       | 4573  | 189          | 4.13 | 35232| 30      | 511   | 150  | 361        |
| Game 674       | 6090  | 128          | 2.10 | 53537| 44      | 306   | 90   | 216        |
| Game 692       | 887   | 126          | 14.21| 5226 | 46      | 404   | 89   | 315        |
| Game 722       | 2241  | 144          | 6.43 | 14517| 48      | 156   | 47   | 109        |
| Game 723       | 830   | 181          | 21.81| 7978 | 13      | 2704  | 1472| 1232       |
| Game 765       | 1327  | 182          | 13.72| 10143| 30      | 462   | 109  | 353        |
| Game 820       | 7235  | 204          | 2.82 | 63551| 41      | 212   | 44   | 168        |
| Game 841       | 1050  | 128          | 12.19| 5957 | 45      | 203   | 65   | 138        |
| Game 906       | 864   | 226          | 26.16| 6934 | 24      | 2013  | 520  | 1493       |

* These two tables are supplementary material for the article: Bockholt, M., Zweig, K. A. (2016). Clustering of Paths in Complex Networks. Proceedings of the 5th International Workshop on Complex Networks and their Applications, Milan, Italy. Springer.

Mareike Bockholt · Katharina A. Zweig
Graph Theory and Complex Network Analysis Group, University of Kaiserslautern, Germany, {mareike.bockholt, zweig}@cs.uni-kl.de
Table 2: The weighted average purity for each of the six similarity measures for a fixed number of clusters. For each game, results for the unnormalized measure are presented in the first line, results for the normalized measure are presented in the second line. $p_x$ denotes the weighted average purity of the clustering when choosing $x$ clusters. For each game and each $x \in \{5, 10, 20, 30\}$ the highest $p_x$ is highlighted. $q(\mathcal{P}_x)$ is denoted by $q$ and gives the fraction of solving or non-solving paths of all paths for the configuration. All values are percentages.

<table>
<thead>
<tr>
<th>Game 19</th>
<th>$\sigma_{cut}$</th>
<th>$\epsilon_{cut}$</th>
<th>$\sigma_{cut}$</th>
<th>$\epsilon_{cut}$</th>
<th>$\sigma_{mad}$</th>
<th>$\epsilon_{mad}$</th>
<th>$\epsilon_{solvepath1}$</th>
<th>$\epsilon_{solvepath2}$</th>
<th>$q$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game 64</td>
<td>89 89 89 89 89</td>
<td>88 88 88 90 89</td>
<td>89 89 89 89 89</td>
<td>89 89 90 94 89</td>
<td>89 90 90 97 89</td>
<td>89 90 97 97</td>
<td>96 96 99 99</td>
<td>96 96 99 99</td>
<td>88.34</td>
</tr>
<tr>
<td>Game 121</td>
<td>86 86 86 87 86</td>
<td>86 86 88 88</td>
<td>88 88 88 90 91</td>
<td>91 94 94 94</td>
<td>89 90 95 95</td>
<td>89 90 95 95</td>
<td>95 95 95 96</td>
<td>95 95 96 97</td>
<td>85.56</td>
</tr>
<tr>
<td>Game 202</td>
<td>76 81 92 92 77</td>
<td>81 98 98 98</td>
<td>98 98 98 98 98</td>
<td>98 98 98 98 98</td>
<td>98 98 98 98 98</td>
<td>98 98 98 98 98</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>75.21</td>
</tr>
<tr>
<td>Game 124</td>
<td>71 71 74 74 71</td>
<td>71 74 74 74</td>
<td>74 74 74 74 74</td>
<td>74 74 74 74 74</td>
<td>74 74 74 74 74</td>
<td>74 74 74 74 74</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>71.38</td>
</tr>
<tr>
<td>Game 260</td>
<td>78 92 92 92 78</td>
<td>92 92 92 92 92</td>
<td>92 92 92 92 92</td>
<td>92 92 92 92 92</td>
<td>92 92 92 92 92</td>
<td>92 92 92 92 92</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>78.14</td>
</tr>
<tr>
<td>Game 326</td>
<td>83 83 83 83 83</td>
<td>83 83 83 83 83</td>
<td>83 83 83 83 83</td>
<td>83 83 83 83 83</td>
<td>83 83 83 83 83</td>
<td>83 83 83 83 83</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>83.45</td>
</tr>
<tr>
<td>Game 357</td>
<td>72 82 82 87 75</td>
<td>82 82 87 87 87</td>
<td>87 87 87 87 87</td>
<td>87 87 87 87 87</td>
<td>87 87 87 87 87</td>
<td>87 87 87 87 87</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>71.71</td>
</tr>
<tr>
<td>Game 393</td>
<td>70 90 93 93 70</td>
<td>90 93 93 93 93</td>
<td>90 93 93 93 93</td>
<td>90 93 93 93 93</td>
<td>90 93 93 93 93</td>
<td>90 93 93 93 93</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>69.71</td>
</tr>
<tr>
<td>Game 441</td>
<td>67 90 90 90 67</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>66.85</td>
</tr>
<tr>
<td>Game 578</td>
<td>75 75 88 88 75</td>
<td>88 88 88 88 88</td>
<td>88 88 88 88 88</td>
<td>88 88 88 88 88</td>
<td>88 88 88 88 88</td>
<td>88 88 88 88 88</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>74.56</td>
</tr>
<tr>
<td>Game 779</td>
<td>71 89 89 89 89</td>
<td>89 89 89 89 89</td>
<td>89 89 89 89 89</td>
<td>89 89 89 89 89</td>
<td>89 89 89 89 89</td>
<td>89 89 89 89 89</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>70.65</td>
</tr>
<tr>
<td>Game 674</td>
<td>71 97 97 98 71</td>
<td>97 97 97 97 97</td>
<td>97 97 97 97 97</td>
<td>97 97 97 97 97</td>
<td>97 97 97 97 97</td>
<td>97 97 97 97 97</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>70.59</td>
</tr>
<tr>
<td>Game 692</td>
<td>78 78 86 86 78</td>
<td>86 86 86 86 86</td>
<td>86 86 86 86 86</td>
<td>86 86 86 86 86</td>
<td>86 86 86 86 86</td>
<td>86 86 86 86 86</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>77.97</td>
</tr>
<tr>
<td>Game 722</td>
<td>80 81 90 93 80</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>90 90 90 90 90</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>69.87</td>
</tr>
<tr>
<td>Game 723</td>
<td>55 56 66 74 55</td>
<td>56 74 74 74 74</td>
<td>74 74 74 74 74</td>
<td>74 74 74 74 74</td>
<td>74 74 74 74 74</td>
<td>74 74 74 74 74</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>54.44</td>
</tr>
<tr>
<td>Game 765</td>
<td>76 78 79 79 76</td>
<td>79 79 79 79 79</td>
<td>79 79 79 79 79</td>
<td>79 79 79 79 79</td>
<td>79 79 79 79 79</td>
<td>79 79 79 79 79</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>76.41</td>
</tr>
<tr>
<td>Game 820</td>
<td>79 81 92 93 79</td>
<td>92 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>79.25</td>
</tr>
<tr>
<td>Game 841</td>
<td>68 68 68 68 68</td>
<td>68 68 68 68 68</td>
<td>68 68 68 68 68</td>
<td>68 68 68 68 68</td>
<td>68 68 68 68 68</td>
<td>68 68 68 68 68</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>67.99</td>
</tr>
<tr>
<td>Game 906</td>
<td>74 76 93 93 74</td>
<td>93 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>93 93 93 93 93</td>
<td>100 100 100 100</td>
<td>100 100 100 100</td>
<td>74.17</td>
</tr>
</tbody>
</table>