|            | 15% CS  |                     |             |          |          |           |
|------------|---------|---------------------|-------------|----------|----------|-----------|
|            | PCCC    | PCCC-N2-S-RD        | COPKM       | CSC      | DILS     | LCC       |
| Dataset    |         |                     |             |          |          |           |
| n1000-k10  | 5.0     | 1.4                 | 19.7        | 26.1     | 3,640.2  | 3,082.7   |
| n1000-k100 | 318.7   | 10.4                | 40.8        | 27.6     | 3,638.6  | 993.7     |
| n1000-k2   | 0.3     | 0.1                 | 538.4       | 26.3     | 3,651.7  | _         |
| n1000-k20  | 93.7    | 33.9                | _           | 27.9     | 3,631.4  | 1,068.1   |
| n1000-k5   | 0.4     | 0.3                 | 125.4       | 23.0     | 3,648.1  | 1,564.4   |
| n1000-k50  | 432.2   | 13.3                | 37.0        | 26.0     | 3,617.4  | 593.4     |
| n2000-k10  | 3.3     | 3.5                 | 561.9       | 222.1    | 3,732.1  | _         |
| n2000-k100 | 662.8   | 28.9                | 161.0       | 222.5    | 3,804.0  | 3,621.1   |
| n2000-k2   | 0.5     | 0.6                 | _           | 236.3    | 3,720.4  |           |
| n2000-k20  | 46.2    | 20.8                | 116.6       | 232.1    | 3,715.0  | 4,564.0   |
| n2000-k5   | 0.5     | 0.5                 | $2,\!432.7$ | 234.7    | 3,713.4  | 515.0     |
| n2000-k50  | 287.7   | 65.2                | _           | 219.4    | 3,711.7  | 3,621.9   |
| n5000-k10  | 2.0     | 1.9                 | _           | 2,833.4  | 4,394.7  | _         |
| n5000-k100 | 3,180.5 | 321.8               | _           | 2,646.7  | 4,268.2  | 4,494.3   |
| n5000-k2   | 3.9     | 2.8                 | _           | 2,930.6  | 3,888.4  | _         |
| n5000-k20  | 19.1    | 10.3                | $6,\!542.6$ | 2,671.3  | 4,293.2  | _         |
| n5000-k5   | 4.3     | 2.0                 | _           | 2,927.7  | 4,376.8  | _         |
| n5000-k50  | 519.2   | $\boldsymbol{92.9}$ | _           | 2,656.8  | 4,159.0  | _         |
| n500-k10   | 5.9     | 1.6                 | _           | 2.8      | 3,557.5  | 95.7      |
| n500-k100  | 127.6   | 3.5                 | 10.2        | 3.5      | 3,529.4  | 390.7     |
| n500-k2    | 0.1     | 0.2                 | 27.1        | 2.9      | 3,616.4  | 8.7       |
| n500-k20   | 46.2    | 10.8                | 9.1         | 3.5      | 3,549.5  | 119.9     |
| n500-k5    | 1.5     | 0.5                 | 4.3         | 3.1      | 3,623.7  | 256.4     |
| n500-k50   | 98.8    | 4.7                 | 9.3         | 4.1      | 3,530.5  | 220.3     |
| Sum        | 5,860.5 | 631.9               | 43,036.1*   | 18,210.3 | 91,011.3 | 54,010.3* |

<sup>\*</sup>Nan values (-) are replaced with 3,600 before computing the sum.

Table W98: Average running times (in seconds) of the PCCC and the PCCC-N2-S algorithms for the constraint sets of size 15% CS. The lowest values are stated in bold. The column KMEANS reports the average running time of the unconstrained k-means algorithm. The hyphen indicates that the respective algorithm returned no solution within the time limit of 3,600 seconds.