# Publication Report

Helmut Simonis and Cemalettin Öztürk

Report Generated on May 2, 2024

## 1 Introduction

This report is a companion document to the main report generated for the extracted information used in the survey of CP and Scheduling. This document is concerned with some of the summary statistics, and with data quality issues that nre highlighted for correction by the authors.

## 2 Data Quality

This section gives an overall overview of the works covered by the survey. We first look at all works, and consider which entries cannot be full analyzed. We consider the following status outcomes: no DOI, the bib entry does not give a DOI, this typically means that we cannot find the citation and reference counts for the work. A special case is the Thesis type, which typically do not have a DOI assigned by the university. Even entries with a DOI may not be covered, we distinguish entries that are covered by neither Crossref nor Scopus, or entries which are covered by one, but not the other. The OK status indicates that we can find the entry in all our sources.

Note that OpenCitations does not distinguish between a DOI that is not covered, and a DOI for which there are no references or citations. In both cases, an empty list is returned by the query.

We may be able to repair some of the entries by finding a DOI for entries which miss them, or by correcting a mistake in a DOI, where neither Crossref nor Scopus recognizes the entry. Note that the system responses are cached, and missing entries are not repeatedly queried by the system. This means that additions or corrections in the databases that occur after we first queried them for a specific entry are not automatically taken into account. It may be good practice to re-run all queries from time to time to reflect updates in the databases.

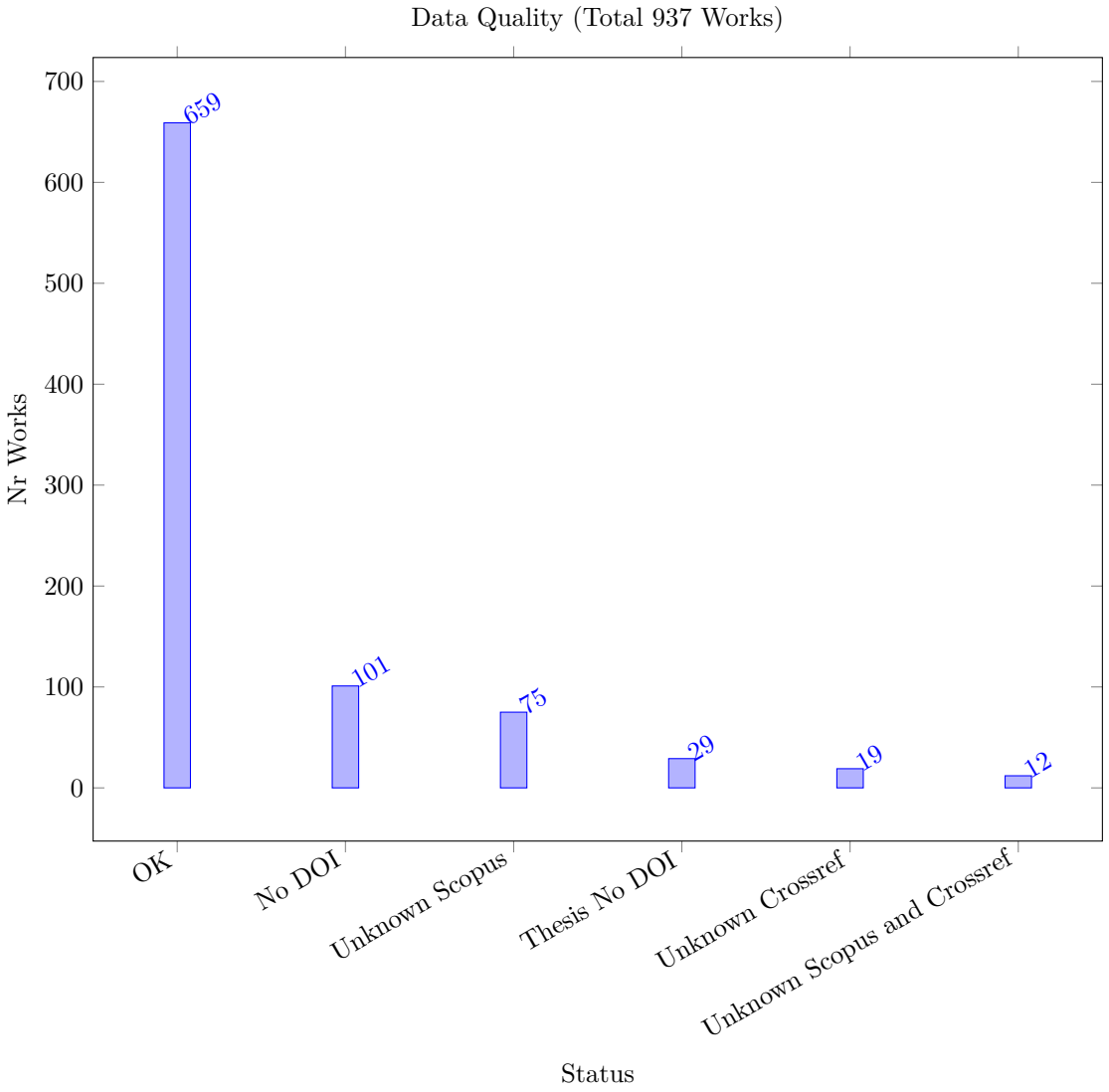

Data Quality (Total 937 Works)
Nr Works
0
100
200
300
400
500
600
700
659
101
75
29
19
12
OK
No DOI
Unknown Scopus
Thesis No DOI
Unknown Crossref
Unknown Scopus and Crossref
Status

Table 1: Works Unknown to Crossref and Scopus

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| abs-2402-00459 | 10.48550/arxiv.2402.00459 | Preprint | 2024 | 0 | 0 | 0 | null | 0 | NaN |
| abs-2305-19888 | 10.48550/arxiv.2305.19888 | Preprint | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| abs-2306-05747 | 10.48550/arxiv.2306.05747 | Preprint | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| abs-2312-13682 | 10.48550/arxiv.2312.13682 | Preprint | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| GokPTGO23 | 10.1007/s10479-022-04547- | ORJournal | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| abs-2211-14492 | 10.48550/arxiv.2211.14492 | Preprint | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| OrnekOS20 | 10.1007/s12351-020-00563- | ORJournal | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| OrnekO16 | 10.23055/ijietap.2016.23.1.1930 | OtherJournal | 2016 | 0 | 0 | 0 | null | 0 | NaN |
| OddiRCS11 | 10.5591/978-1-57735-516-8/ijcai11-332 | IJCAI | 2011 | 0 | 0 | 0 | null | 0 | NaN |
| AronssonBK09 | 10.4230/oasics.atmos.2009.2141 | OtherConf | 2009 | 0 | 0 | 0 | null | 0 | NaN |
| KanetAG04 | 10.1201/9780203489802.ch47 | Incoll | 2004 | 0 | 0 | 0 | null | 0 | NaN |
| BeckF98 | 10.1609/aimag.v19i4.1426 | AIJournal | 1998 | 0 | 0 | 0 | null | 0 | NaN |

Table 2: Works Unknown to Crossref

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| JuvinHHL23 | 10.4230/lipics.cp.2023.19 | CP | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| PovedaAA23 | 10.4230/lipics.cp.2023.31 | CP | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| AalianPG23 | 10.4230/lipics.cp.2023.6 | CP | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| KameugneFND23 | 10.4230/lipics.cp.2023.20 | CP | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| BoudreaultSLQ22 | 10.4230/lipics.cp.2022.10 | CP | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| PopovicCGNC22 | 10.4230/lipics.cp.2022.34 | CP | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| WinterMMW22 | 10.4230/lipics.cp.2022.41 | CP | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| ArmstrongGOS21 | 10.4230/lipics.cp.2021.16 | CP | 2021 | 1 | 0 | 1 | null | 1 | 100.00 |
| AntuoriHHEN21 | 10.4230/lipics.cp.2021.14 | CP | 2021 | 0 | 0 | 1 | null | 1 | 100.00 |
| KovacsTKSG21 | 10.4230/lipics.cp.2021.36 | CP | 2021 | 0 | 0 | 4 | null | 4 | 100.00 |
| LacknerMMWW21 | 10.4230/lipics.cp.2021.37 | CP | 2021 | 0 | 0 | 3 | null | 3 | 100.00 |
| WangB20 | 10.3233/faia200114 | ECAI | 2020 | 0 | 0 | 0 | null | 0 | NaN |
| BarzegaranZP20 | 10.4230/oasics.fog-iot.2020.3 | OtherConf | 2020 | 0 | 0 | 0 | null | 0 | NaN |
| BridiLBBM16 | 10.3233/978-1-61499-672-9-1598 | ECAI | 2016 | 0 | 0 | 0 | null | 0 | NaN |
| BartakV15 | 10.5220/0005215701190130 | OtherConf | 2015 | 0 | 0 | 1 | null | 1 | 100.00 |
| TranB12 | 10.3233/978-1-61499-098-7-774 | ECAI | 2012 | 0 | 0 | 30 | null | 30 | 100.00 |
| PacinoH11 | 10.5591/978-1-57735-516-8/ijcai11-333 | IJCAI | 2011 | 0 | 0 | 0 | null | 0 | NaN |
| OddiRC10 | 10.3233/978-1-60750-606-5-967 | ECAI | 2010 | 0 | 0 | 2 | null | 2 | 100.00 |
| Hunsberger08 | 10.3233/978-1-58603-891-5-553 | ECAI | 2008 | 0 | 0 | 1 | null | 1 | 100.00 |

Table 3: Works Unknown to Scopus

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| Caballero23 | 10.1007/s10601-023-09357-0 | Constraints | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| NaderiBZ23 | 10.2139/ssrn.4494381 | Preprint | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| GunerGSKD23 | 10.1080/00207543.2023.2226772 | OtherJournal | 2023 | 0 | 3 | 0 | null | 3 | 100.00 |

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| IklassovMR023 | 10.24963/ijcai.2023/594 | IJCAI | 2023 | 0 | 0 | 0 | null | 0 | NaN |
| HebrardALLCMR22 | 10.24963/ijcai.2022/643 | IJCAI | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| NaderiBZ22 | 10.2139/ssrn.4140716 | Preprint | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| JuvinHL22 | 10.2139/ssrn.4068164 | Preprint | 2022 | 0 | 0 | 0 | null | 0 | NaN |
| NaderiR22 | 10.1287/ijoo.2021.0056 | ORJournal | 2022 | 5 | 7 | 0 | null | 7 | 100.00 |
| KotaryFH22 | 10.1609/aaai.v36i7.20685 | AAAI | 2022 | 0 | 2 | 0 | null | 2 | 100.00 |
| QinWSLS21 | 10.1109/tase.2019.2947398 | OtherJournal | 2021 | 12 | 19 | 0 | null | 19 | 100.00 |
| GeibingerMM21 | 10.1609/aaai.v35i7.16789 | AAAI | 2021 | 0 | 1 | 0 | null | 1 | 100.00 |
| KletzanderMH21 | 10.1609/aaai.v35i13.17408 | AAAI | 2021 | 2 | 2 | 0 | null | 2 | 100.00 |
| Pinarbasi21 | 10.1080/0305215x.2021.1921171 | OtherJournal | 2021 | 3 | 6 | 0 | null | 6 | 100.00 |
| GodetLHS20 | 10.1609/aaai.v34i02.5510 | AAAI | 2020 | 1 | 1 | 0 | null | 1 | 100.00 |
| FallahiAC20 | 10.1504/ijams.2020.10026882 | OtherJournal | 2020 | 0 | 0 | 0 | null | 0 | NaN |
| AbidinK20 | 10.1016/j.cor.2020.105069 | ORJournal | 2020 | 11 | 14 | 0 | null | 14 | 100.00 |
| NishikawaSTT19 | 10.15803/ijnc.9.2_131 | OtherJournal | 2019 | 3 | 3 | 0 | null | 3 | 100.00 |
| BlazewiczEP19 | 10.1007/978-3-319-99849-7 | Incoll | 2019 | 38 | 38 | 0 | null | 38 | 100.00 |
| PinarbasiAY19 | 10.1108/aa-12-2018-0262 | OtherJournal | 2019 | 16 | 18 | 0 | null | 18 | 100.00 |
| AlakaPY19 | 10.1007/s00500-019-04294-8 | OtherJournal | 2019 | 15 | 17 | 0 | null | 17 | 100.00 |
| PachecoPR19 | 10.24963/ijcai.2019/161 | IJCAI | 2019 | 1 | 1 | 0 | null | 1 | 100.00 |
| BhatnagarKL19 | 10.24963/ijcai.2019/803 | IJCAI | 2019 | 1 | 1 | 0 | null | 1 | 100.00 |
| RiahiNS018 | 10.1609/icaps.v28i1.13895 | ICAPS | 2018 | 4 | 4 | 0 | null | 4 | 100.00 |
| AgussurjaKL18 | 10.1609/aaai.v32i1.12086 | AAAI | 2018 | 4 | 4 | 0 | null | 4 | 100.00 |
| TranVNB17a | 10.24963/ijcai.2017/726 | IJCAI | 2017 | 1 | 1 | 0 | null | 1 | 100.00 |
| Bonfietti16 | 10.3233/ia-160095 | AIJournal | 2016 | 0 | 0 | 0 | null | 0 | NaN |
| TranDRFWOVB16 | 10.1609/socs.v7i1.18390 | OtherConf | 2016 | 3 | 9 | 0 | null | 9 | 100.00 |
| FrankDT16 | 10.1609/icaps.v26i1.13780 | ICAPS | 2016 | 4 | 5 | 0 | null | 5 | 100.00 |
| KinsellaS0OS16 | 10.1609/aaai.v30i2.19079 | AAAI | 2016 | 1 | 2 | 0 | null | 2 | 100.00 |
| Siala15 | 10.1007/s10601-015-9213-y | Constraints | 2015 | 4 | 3 | 0 | null | 4 | 100.00 |
| Kameugne15 | 10.1007/s10601-015-9227-5 | Constraints | 2015 | 0 | 0 | 0 | null | 0 | NaN |
| LimBTBB15a | 10.1609/aaai.v29i1.9236 | AAAI | 2015 | 3 | 3 | 0 | null | 3 | 100.00 |
| FriedrichFMRSST14 | 10.1007/978-3-319-28697-6_23 | OtherConf | 2014 | 3 | 3 | 0 | null | 3 | 100.00 |
| LipovetzkyBPS14 | 10.1609/icaps.v24i1.13666 | ICAPS | 2014 | 5 | 5 | 0 | null | 5 | 100.00 |
| LudwigKRBMS14 | 10.1609/aaai.v28i2.19030 | AAAI | 2014 | 1 | 1 | 0 | null | 1 | 100.00 |
| ChunS14 | 10.1609/aaai.v28i2.19013 | AAAI | 2014 | 3 | 3 | 0 | null | 3 | 100.00 |
| BonfiettiLM13 | 10.1609/icaps.v23i1.13608 | ICAPS | 2013 | 1 | 1 | 0 | null | 1 | 100.00 |
| LombardiM13 | 10.1609/icaps.v23i1.13580 | ICAPS | 2013 | 3 | 0 | 0 | null | 3 | 100.00 |
| TranTDB13 | 10.1609/icaps.v23i1.13552 | ICAPS | 2013 | 2 | 2 | 0 | null | 2 | 100.00 |
| MalapertCGJLR13 | 10.1609/icaps.v23i1.13575 | ICAPS | 2013 | 0 | 0 | 0 | null | 0 | NaN |
| BajestaniB11 | 10.1609/icaps.v21i1.13450 | ICAPS | 2011 | 2 | 2 | 0 | null | 2 | 100.00 |
| Milano11 | 10.1002/9780470400531.eorms0473 | Inbook | 2011 | 0 | 0 | 0 | null | 0 | NaN |
| Baptiste09 | 10.1007/978-3-642-04244-7_1 | CP | 2009 | 0 | 0 | 0 | null | 0 | NaN |
| MonetteDH09 | 10.1609/icaps.v19i1.13356 | ICAPS | 2009 | 9 | 10 | 0 | null | 10 | 100.00 |
| MercierH08 | 10.1287/ijoc.1070.0226 | InformsJC | 2008 | 32 | 33 | 0 | null | 33 | 100.00 |
| AggounMV08 | 10.1007/978-0-387-74759-0_396 | Inbook | 2008 | 0 | 0 | 0 | null | 0 | NaN |
| Limtanyakul07 | 10.1007/978-3-540-77903-2_65 | OtherConf | 2007 | 2 | 2 | 0 | null | 2 | 100.00 |
| NeronABCDD06 | 10.1007/978-0-387-33768-5_7 | Inbook | 2006 | 3 | 3 | 0 | null | 3 | 100.00 |
| RussellU06 | 10.1016/j.cor.2004.09.029 | ORJournal | 2006 | 22 | 22 | 0 | null | 22 | 100.00 |
| OddiPCC05 | 10.1007/0-387-27744-7_7 | OtherConf | 2005 | 3 | 3 | 0 | null | 3 | 100.00 |
| DannaP04 | 10.1007/978-1-4419-8917-8_2 | Inbook | 2004 | 2 | 2 | 0 | null | 2 | 100.00 |
| AjiliW04 | 10.1007/978-1-4419-8917-8_6 | Inbook | 2004 | 4 | 4 | 0 | null | 4 | 100.00 |
| AggounV04 | 10.1007/978-3-540-24734-0_15 | Inbook | 2004 | 7 | 7 | 0 | null | 7 | 100.00 |
| HenzMT04 | 10.1016/s0377-2217(03)00101-2 | EJOR | 2004 | 44 | 47 | 0 | null | 47 | 100.00 |
| Tsang03 | 10.1023/a:1024016929283 | OtherJournal | 2003 | 1 | 0 | 0 | null | 1 | 100.00 |
| DomdorfPH03 | 10.1007/978-3-642-18965-4_31 | Inbook | 2003 | 0 | 0 | 0 | null | 0 | NaN |

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| Apt03 | 10.1017/cbo9780511615320 | Background | 2003 | 381 | 374 | 0 | null | 381 | 100.00 |
| ElkhyariGJ02 | 10.1007/3-540-46135-3_49 | CP | 2002 | 1 | 1 | 0 | null | 1 | 100.00 |
| ZhuS02 | 10.1007/3-540-47961-9_69 | OtherConf | 2002 | 0 | 0 | 0 | null | 0 | NaN |
| MilanoORT02 | 10.1287/ijoc.14.4.387.2830 | InformsJC | 2002 | 14 | 14 | 0 | null | 14 | 100.00 |
| Hooker02 | 10.1287/ijoc.14.4.295.2828 | InformsJC | 2002 | 94 | 93 | 0 | null | 94 | 100.00 |
| Hentenryck02 | 10.1287/ijoc.14.4.345.2826 | Background | 2002 | 48 | 50 | 0 | null | 50 | 100.00 |
| EastonNT02 | 10.1007/978-3-540-45157-0_6 | OtherConf | 2002 | 48 | 50 | 0 | null | 50 | 100.00 |
| BaptistePN01 | 10.1007/978-1-4615-1479-4 | Book | 2001 | 296 | 302 | 0 | null | 302 | 100.00 |
| BosiM2001 | 10.1002/1097-024x(200101)31:1<17::aid-spe355>3.0.co;2-l | OtherJournal | 2001 | 3 | 3 | 0 | null | 3 | 100.00 |
| Henz01 | 10.1287/opre.49.1.163.11193 | ORJournal | 2001 | 65 | 68 | 0 | null | 68 | 100.00 |
| Rgin2001 | 10.1090/dimacs/057/07 | Inbook | 2001 | 28 | 29 | 0 | null | 29 | 100.00 |
| LopezAKYG00 | 10.1016/s0947-3580(00)71114-9 | OtherJournal | 2000 | 0 | 0 | 0 | null | 0 | NaN |
| Hooker00 | 10.1002/9781118033036 | Book | 2000 | 185 | 186 | 0 | null | 186 | 100.00 |
| Simonis99 | 10.1007/3-540-45406-3_6 | OtherConf | 1999 | 5 | 5 | 0 | null | 5 | 100.00 |
| DorndorfPH99 | 10.1007/978-3-642-58409-1_35 | OtherConf | 1999 | 0 | 0 | 0 | null | 0 | NaN |
| DorndorfHP99 | 10.1007/978-1-4615-5533-9_10 | Inbook | 1999 | 18 | 18 | 0 | null | 18 | 100.00 |
| CarlssonKA99 | 10.1007/3-540-49201-1_23 | OtherConf | 1999 | 1 | 1 | 0 | null | 1 | 100.00 |
| PembertonG98 | 10.1090/dimacs/057/06 | OtherConf | 1998 | 26 | 0 | 0 | null | 26 | 100.00 |
| MarriottS98 | 10.7551/mitpress/5625.001.0001 | Background | 1998 | 410 | 423 | 0 | null | 423 | 100.00 |
| BeckDDF98 | 10.1002/(sici)1099-1425(199808)1:2<89::aid-jos9>3.0.co;2-h | OtherJournal | 1998 | 9 | 8 | 0 | null | 9 | 100.00 |
| Simonis95a | 10.1007/3-540-60794-3_11 | OtherConf | 1995 | 1 | 1 | 0 | null | 1 | 100.00 |
| BaptisteLV92 | 10.1109/robot.1992.220195 | OtherConf | 1992 | 13 | 11 | 0 | null | 13 | 100.00 |
| CarlierP90 | 10.1007/bf03543071 | Background | 1990 | 112 | 114 | 0 | null | 114 | 100.00 |
| CarlierP89 | 10.1287/mnsc.35.2.164 | Background | 1989 | 516 | 524 | 0 | null | 524 | 100.00 |
| PritskerWW69 | 10.1287/mnsc.16.1.93 | Background | 1969 | 504 | 518 | 0 | null | 518 | 100.00 |

## 2.1 Range of Citation Counts

We get citation counts for the works included in the survey from different sources. OpenCitations provides the set of papers citing a reference, but only if both have DOIs. Crossref gives a count of how many papers cite a reference, they include some papers without DOI. Scopus gives a citation count, but does not give access to the actual citations. In this table we show the works with the largest range of citation count, excluding all background works. A typical issue is that one source does not cover the work, and has a zero count. An alternative is where papers with many citations give a slightly different count depending on which links are included in their database.

The results seem to indicate the using multiple sources is required, to avoid leaving out works that are not covered by one specific source. Note that the WoS numbers are only present for a few works, we show them, but do not include them in computing range.

Table 4: Works with largest Range of Citation Counts

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| BaptistePN01 | 10.1007/978-1-4615-1479-4 | Book | 2001 | 296 | 302 | 0 | null | 302 | 100.00 |
| Hooker00 | 10.1002/9781118033036 | Book | 2000 | 185 | 186 | 0 | null | 186 | 100.00 |
| BensanaLV99 | 10.1023/a:1026488509554 | Constraints | 1999 | 99 | 0 | 150 | null | 150 | 100.00 |
| JainM99 | 10.1016/s0377-2217(98)00113-1 | EJOR | 1999 | 490 | 503 | 630 | null | 140 | 22.22 |
| SakkoutW00 | 10.1023/a:1009856210543 | Constraints | 2000 | 73 | 0 | 105 | null | 105 | 100.00 |
| Hooker02 | 10.1287/ijoc.14.4.295.2828 | InformsJC | 2002 | 94 | 93 | 0 | null | 94 | 100.00 |

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| MintonJPL92 | 10.1016/0004-3702(92)90007-k | AIJournal | 1992 | 437 | 440 | 525 | null | 88 | 16.76 |
| BaptistePN99 | 10.1023/a:1018995000688 | ORJournal | 1999 | 72 | 0 | 85 | null | 85 | 100.00 |
| OhrimenkoSC09 | 10.1007/s10601-008-9064-x | Constraints | 2009 | 127 | 128 | 198 | null | 71 | 35.86 |
| BlazewiczDP96 | 10.1016/0377-2217(95)00362-2 | EJOR | 1996 | 344 | 357 | 412 | null | 68 | 16.50 |
| Henz01 | 10.1287/opre.49.1.163.11193 | ORJournal | 2001 | 65 | 68 | 0 | null | 68 | 100.00 |
| RodosekWH99 | 10.1023/a:1018904229454 | ORJournal | 1999 | 53 | 0 | 67 | null | 67 | 100.00 |
| ArtiguesDN08 | 10.1002/9780470611227 | Book | 2008 | 63 | 0 | 0 | null | 63 | 100.00 |
| BaptisteP00 | 10.1023/a:1009822502231 | Constraints | 2000 | 46 | 0 | 62 | null | 62 | 100.00 |
| BeldiceanuC94 | 10.1016/0895-7177(94)90127-9 | OtherJournal | 1994 | 167 | 169 | 223 | null | 56 | 25.11 |
| LaborieRSV18 | 10.1007/s10601-018-9281-x | Constraints | 2018 | 148 | 178 | 203 | null | 55 | 27.09 |
| HookerO03 | 10.1007/s10107-003-0375-9 | OtherJournal | 2003 | 317 | 333 | 371 | null | 54 | 14.56 |
| MengZRZL20 | 10.1016/j.cie.2020.106347 | OtherJournal | 2020 | 100 | 133 | 152 | null | 52 | 34.21 |
| Wallace96 | 10.1007/bf00143881 | Constraints | 1996 | 87 | 89 | 138 | null | 51 | 36.96 |
| NuijtenP98 | 10.1023/a:1009687210594 | OtherJournal | 1998 | 42 | 0 | 50 | null | 50 | 100.00 |
| EastonNT02 | 10.1007/978-3-540-45157-0_6 | OtherConf | 2002 | 48 | 50 | 0 | null | 50 | 100.00 |
| Laborie03 | 10.1016/s0004-3702(02)00362-4 | AIJournal | 2003 | 128 | 129 | 175 | null | 47 | 26.86 |
| HenzMT04 | 10.1016/s0377-2217(03)00101-2 | EJOR | 2004 | 44 | 47 | 0 | null | 47 | 100.00 |
| BeckR03 | 10.1023/a:1021849405707 | ORJournal | 2003 | 29 | 0 | 45 | null | 45 | 100.00 |
| AchterbergBKW08 | 10.1007/978-3-540-68155-7_4 | CPAIOR | 2008 | 80 | 80 | 125 | null | 45 | 36.00 |
| JainG01 | 10.1287/ijoc.13.4.258.9733 | InformsJC | 2001 | 279 | 284 | 321 | null | 42 | 13.08 |
| Laborie09 | 10.1007/978-3-642-01929-6_12 | CPAIOR | 2009 | 53 | 52 | 91 | null | 39 | 42.86 |
| KendallKRU10 | 10.1016/j.cor.2009.05.013 | ORJournal | 2010 | 181 | 186 | 220 | 161 | 39 | 17.73 |
| BlazewiczEP19 | 10.1007/978-3-319-99849-7 | Incoll | 2019 | 38 | 38 | 0 | null | 38 | 100.00 |
| HarjunkoskiMBC14 | 10.1016/j.compchemeng.2013.12.001 | OtherJournal | 2014 | 381 | 393 | 418 | null | 37 | 8.85 |
| SadehF96 | 10.1016/0004-3702(95)00098-4 | AIJournal | 1996 | 95 | 97 | 131 | null | 36 | 27.48 |
| BeckW07 | 10.1613/jair.2080 | AIJournal | 2007 | 27 | 31 | 61 | null | 34 | 55.74 |
| Ham18 | 10.1016/j.trc.2018.03.025 | OtherJournal | 2018 | 164 | 192 | 197 | null | 33 | 16.75 |
| MercierH08 | 10.1287/ijoc.1070.0226 | InformsJC | 2008 | 32 | 33 | 0 | null | 33 | 100.00 |
| PerronSF04 | 10.1007/978-3-540-30201-8_35 | CP | 2004 | 34 | 34 | 67 | null | 33 | 49.25 |
| SchildW00 | 10.1023/a:1009804226473 | Constraints | 2000 | 23 | 0 | 32 | null | 32 | 100.00 |
| CorreaLR07 | 10.1016/j.cor.2005.07.004 | ORJournal | 2007 | 106 | 114 | 137 | null | 31 | 22.63 |
| LiW08 | 10.1007/s10951-008-0079-3 | OtherJournal | 2008 | 113 | 123 | 144 | null | 31 | 21.53 |
| TranB12 | 10.3233/978-1-61499-098-7-774 | ECAI | 2012 | 0 | 0 | 30 | null | 30 | 100.00 |
| Thorsteinsson01 | 10.1007/3-540-45578-7_2 | CP | 2001 | 67 | 68 | 97 | null | 30 | 30.93 |
| Rgin2001 | 10.1090/dimacs/057/07 | Inbook | 2001 | 28 | 29 | 0 | null | 29 | 100.00 |
| AggounB93 | 10.1016/0895-7177(93)90068-a | OtherJournal | 1993 | 187 | 191 | 214 | null | 27 | 12.62 |
| PembertonG98 | 10.1090/dimacs/057/06 | OtherConf | 1998 | 26 | 0 | 0 | null | 26 | 100.00 |
| Beck10 | 10.1007/978-3-642-15396-9_10 | CP | 2010 | 19 | 21 | 45 | null | 26 | 57.78 |
| NuijtenA96 | 10.1016/0377-2217(95)00354-1 | EJOR | 1996 | 65 | 65 | 90 | null | 25 | 27.78 |
| VilimLS15 | 10.1007/978-3-319-18008-3_30 | CPAIOR | 2015 | 31 | 31 | 55 | null | 24 | 43.64 |
| Rodriguez07 | 10.1016/j.trb.2006.02.006 | OtherJournal | 2007 | 117 | 121 | 141 | null | 24 | 17.02 |
| Hooker07 | 10.1287/opre.1060.0371 | ORJournal | 2007 | 181 | 197 | 205 | null | 24 | 11.71 |
| MengGRZSC22 | 10.1016/j.swevo.2022.101058 | OtherJournal | 2022 | 38 | 56 | 62 | null | 24 | 38.71 |
| Davis87 | 10.1016/0004-3702(87)90091-9 | AIJournal | 1987 | 308 | 312 | 332 | null | 24 | 7.23 |

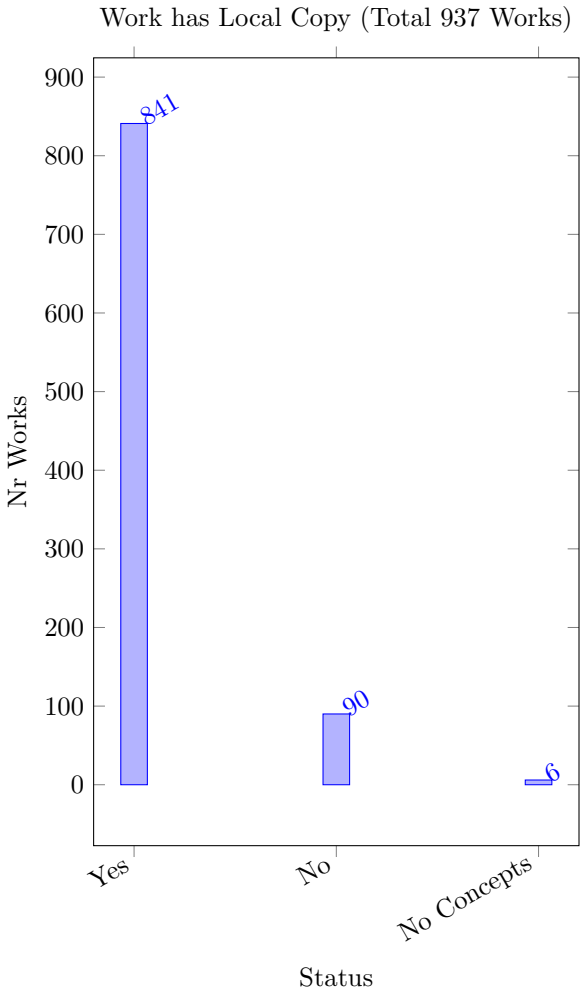
We only have Web of Science data in a few bibtex entries, we here try to evaluate their citation numbers on those bib entries which are from WoS.

Table 5: Works with WoS Citation Counts

| Key | DOI | Source Group | Year | Nr Citations | Crossref Citations | Scopus Citations | WoS Citations | Range Citations | Range Percentage |
|---|---|---|---|---|---|---|---|---|---|
| KendallKRU10 | 10.1016/j.cor.2009.05.013 | ORJournal | 2010 | 181 | 186 | 220 | 161 | 39 | 17.73 |
| MeskensDL13 | 10.1016/j.dss.2012.10.019 | OtherJournal | 2013 | 102 | 102 | 116 | 103 | 14 | 12.07 |
| RasmussenT07 | 10.1016/j.ejor.2005.10.063 | EJOR | 2007 | 60 | 62 | 71 | 53 | 11 | 15.49 |
| Ribeiro12 | 10.1111/j.1475-3995.2011.00819.x | OtherJournal | 2012 | 47 | 52 | 54 | 41 | 7 | 12.96 |
| ElfJR03 | 10.1016/s0167-6377(03)00025-7 | OtherJournal | 2003 | 41 | 41 | 45 | 34 | 4 | 8.89 |
| Trick03 | 10.1007/978-3-540-45157-0_4 | OtherConf | 2003 | 22 | 24 | 39 | 34 | 17 | 43.59 |
| RasmussenT06 | 10.1007/11757375_15 | CPAIOR | 2006 | 10 | 12 | 19 | 11 | 9 | 47.37 |
| FelizariAL09 | 10.1016/s1570-7946(05)80013-6 | OtherConf | 2009 | 7 | 7 | 12 | 1 | 5 | 41.67 |
| MagataoAN05 | 10.1016/s1570-7946(05)80013-6 | OtherConf | 2005 | 7 | 7 | 12 | 12 | 5 | 41.67 |
| RasmussenT09 | 10.1007/s10479-008-0384-4 | ORJournal | 2009 | 8 | 9 | 9 | 8 | 1 | 11.11 |
| Trick11 | 10.1007/978-1-4419-1644-0_15 | Incoll | 2011 | 2 | 2 | 5 | 5 | 3 | 60.00 |
| LiuLH19a | 10.5220/0007252300290039 | OtherConf | 2019 | 3 | 3 | 4 | 4 | 1 | 25.00 |
| SuCC13 | 10.1016/j.cie.2013.02.021 | OtherJournal | 2013 | 2 | 2 | 4 | 1 | 2 | 50.00 |
| ZengM12 | 10.1016/j.cor.2011.10.004 | ORJournal | 2012 | 3 | 3 | 4 | 3 | 1 | 25.00 |
| GhandehariK22 | 10.1016/j.apm.2022.01.001 | OtherJournal | 2022 | 4 | 4 | 4 | 3 | 0 | 0.00 |
| BulckG22 | 10.1007/s10951-021-00717-3 | OtherJournal | 2022 | 2 | 3 | 3 | 3 | 1 | 33.33 |
| Perron05 | 10.1007/11564751_67 | CP | 2005 | 1 | 1 | 2 | 1 | 1 | 50.00 |
| LiuLH18 | 10.1007/978-3-030-05918-7_7 | OtherConf | 2018 | 2 | 2 | 1 | 1 | 1 | 50.00 |
| MeskensDHG11 | n/a | OtherConf | 2011 | 0 | 0 | 0 | null | 0 | NaN |
| NaqviAIAAA22 | 10.32604/cmc.2022.019653 | OtherJournal | 2022 | 0 | 0 | 0 | 0 | 0 | NaN |
| KonowalenkoMM19 | 10.1109/tla.2019.8932340 | OtherJournal | 2019 | 0 | 0 | 0 | 0 | 0 | NaN |

## 2.2 Local Copies

The tool relies on local pdf copies of works to perform a detailed analysis of the content of the work. We have collected our own private copies of works for that purpose. The following plot shows how many entries do not have a local copy, or which do not extract any concepts from the local copy. A detailed list of all missing entries is given in the main report. Note that in some cases we use an open access version of the work, which might differ slightly from the published version.




## 2.3 Orphan Files

The following list shows entries for which we have a pdf file in the works directory, but the name of hte file does not match any key in the bibliography. These orphans should be resolved, either by correcting the name, or adding a bib entry for the work, or by removing the file, if it is not required.

If there are no files listed, then all pdf files in the works directory correspond to a bib entry, and no clean-up is required.

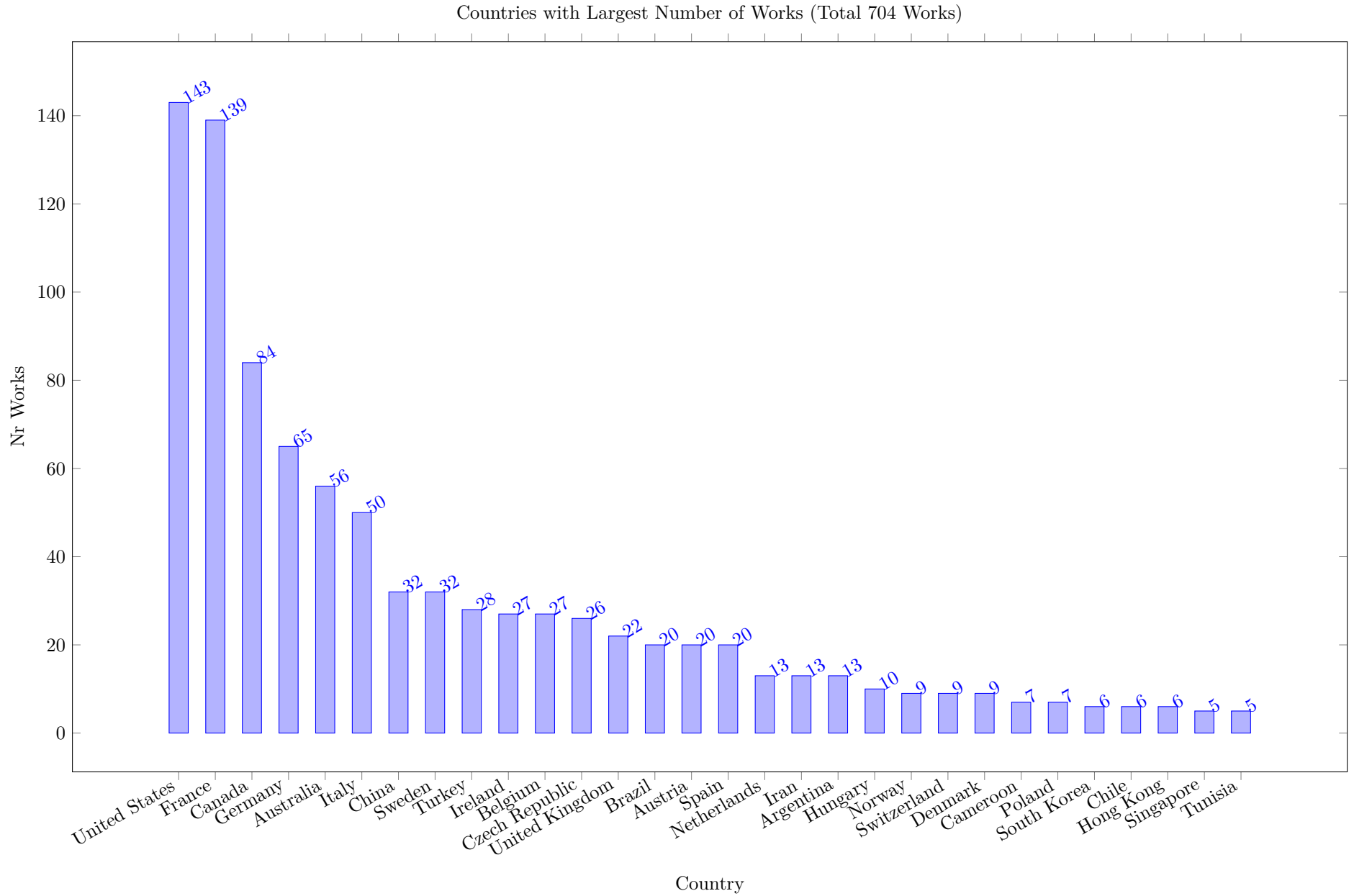
Table 6: Orphan Files

| Key | File |
|---|---|

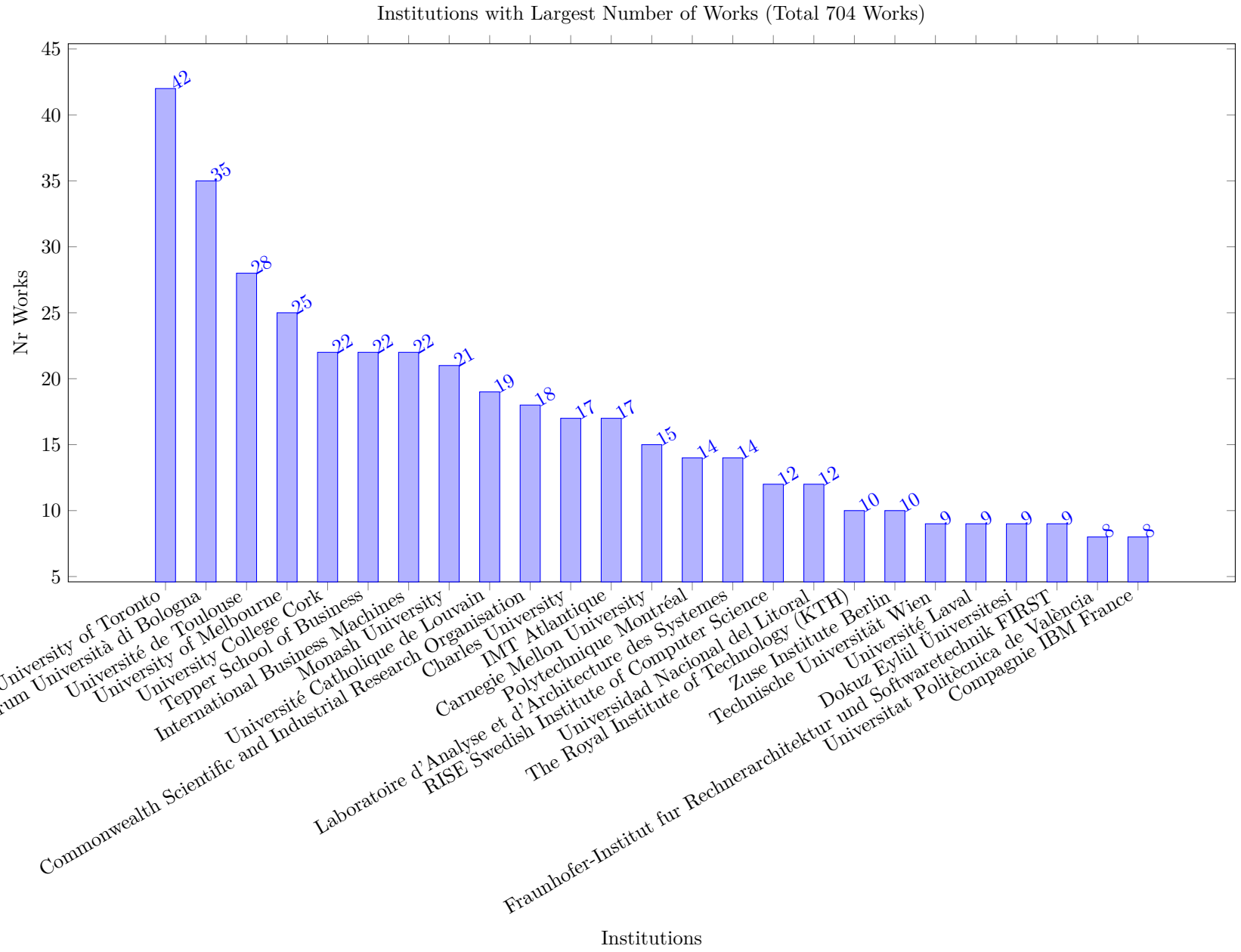
# 3 Works by Location

This section analyzes papers by affiliation, which is given by the Scopus data only. Only works which are covered by Scopus are included. We first present the number of papers by country. A paper is counted in this analysis (once), if at least one of the affiliations is from the country. Multiple affiliations from the same country only count once. The 30 countries with the largest counts are shown.

Note that one work will be counted for multiple countries, if the affiliations are from different countries. So the sum of the bar heights typically exceeds the total number of works considered.

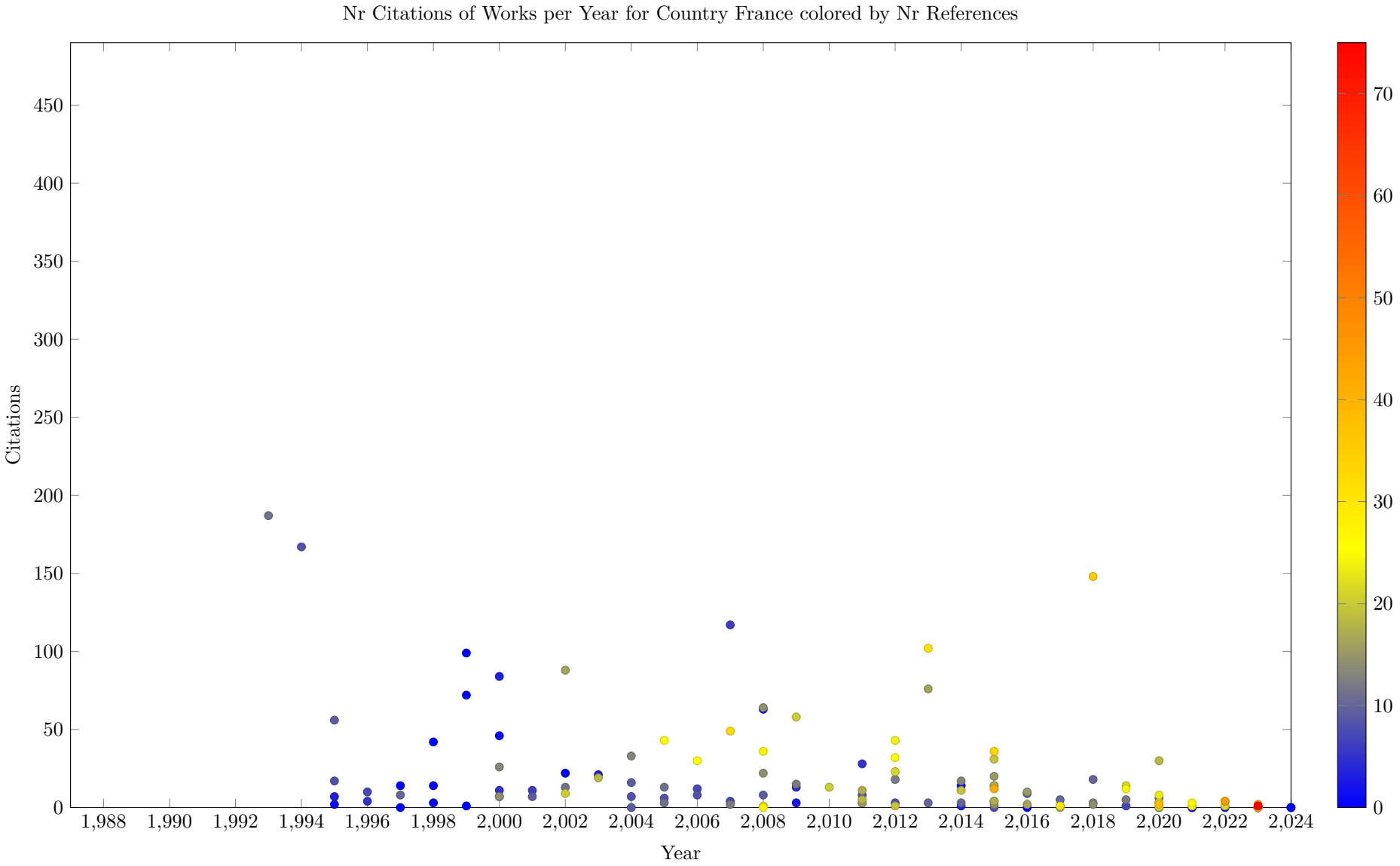

Countries with Largest Number of Works (Total 704 Works)
Nr Works
0
20
40
60
80
100
120
140
143
139
84
65
56
50
32
32
28
27
27
26
22
20
20
20
13
13
13
10
9
9
9
7
7
6
6
6
5
5
United States
France
Canada
Germany
Australia
Italy
China
Sweden
Turkey
Ireland
Belgium
Czech Republic
United Kingdom
Brazil
Austria
Spain
Netherlands
Iran
Argentina
Hungary
Norway
Switzerland
Denmark
Cameroon
Poland
South Korea
Chile
Hong Kong
Singapore
Tunisia
Country

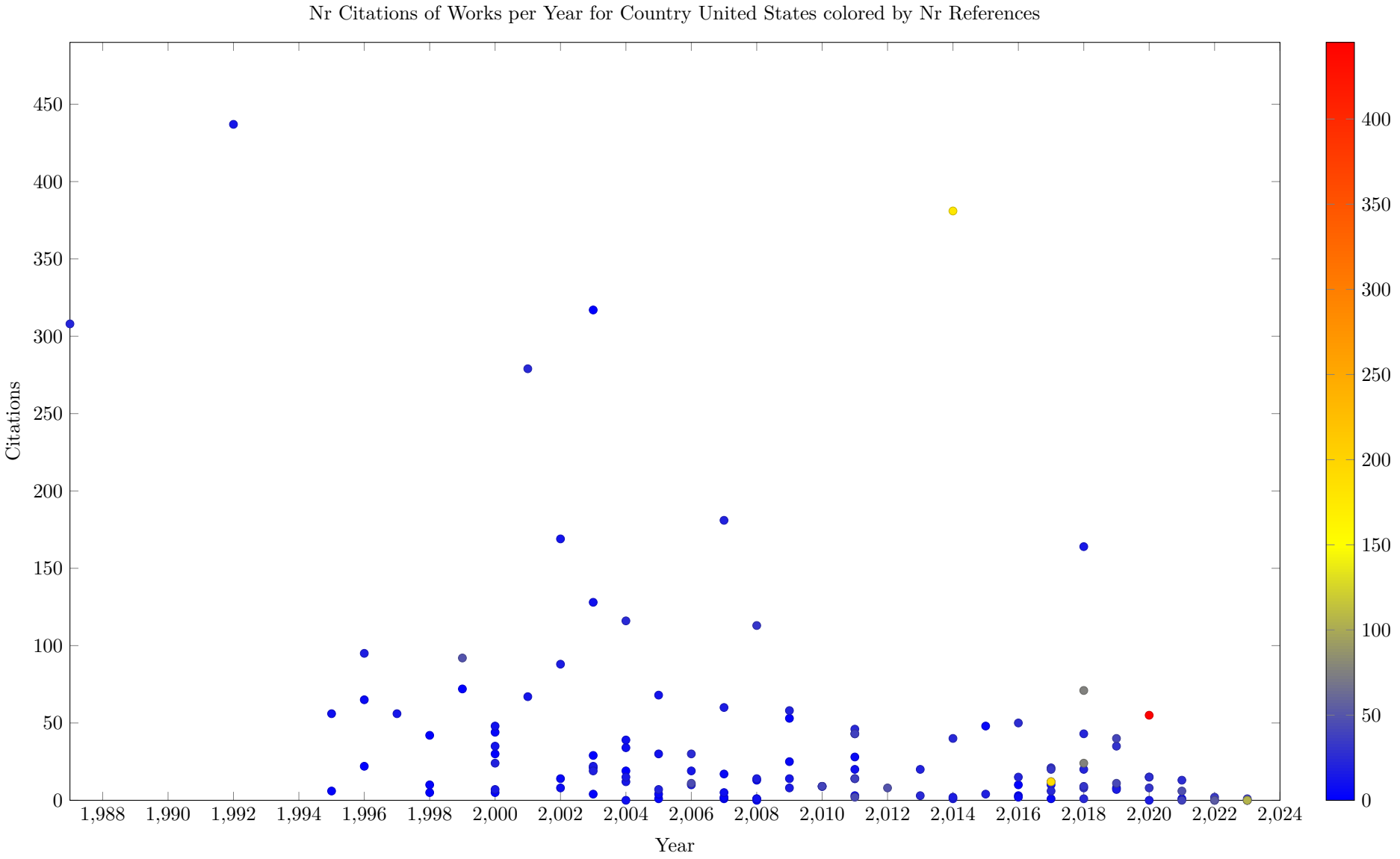
The next plot shows the number of papers associated to institutions, as stated in the Scopus affiliation. A work is counted, if at least one of the affiliations is from a given institution. Due to the format of the Scopus data, we cannot fractionally assign a paper based on the author affiliations, each paper is counted one for every institution for which an affiliation is given. If some author has multiple affiliations listed, we (mis)count the work for each of them.

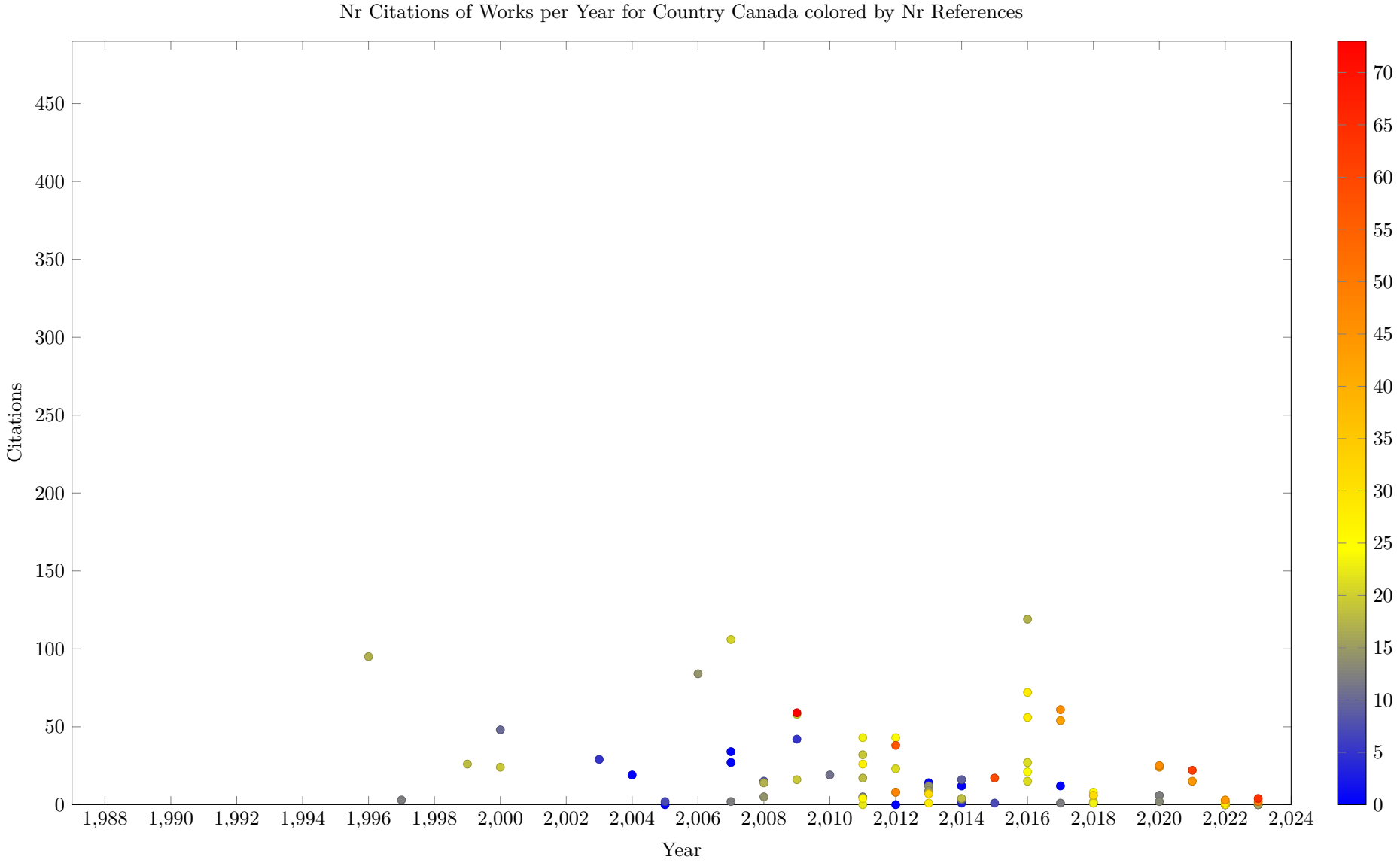

Institutions with Largest Number of Works (Total 704 Works)
Nr Works
Institutions
45
40
35
30
25
20
15
10
5
42
35
28
25
22
22
22
21
19
18
17
17
15
14
14
12
12
10
10
9
9
9
9
8
8
University of Toronto
Alma Mater Studiorum Università di Bologna
Université de Toulouse
University of Melbourne
University College Cork
Tepper School of Business
International Business Machines
Monash University
Université Catholique de Louvain
Commonwealth Scientific and Industrial Research Organisation
Charles University
IMT Atlantique
Carnegie Mellon University
Polytechnique Montréal
Laboratoire d'Analyse et d'Architecture des Systemes
RISE Swedish Institute of Computer Science
Universidad Nacional del Litoral
The Royal Institute of Technology (KTH)
Zuse Institute Berlin
Technische Universität Wien
Université Laval
Dokuz Eylül Üniversitesi
Fraunhofer-Institut fur Rechnerarchitektur und Softwaretechnik FIRST
Universitat Politècnica de València
Compagnie IBM France

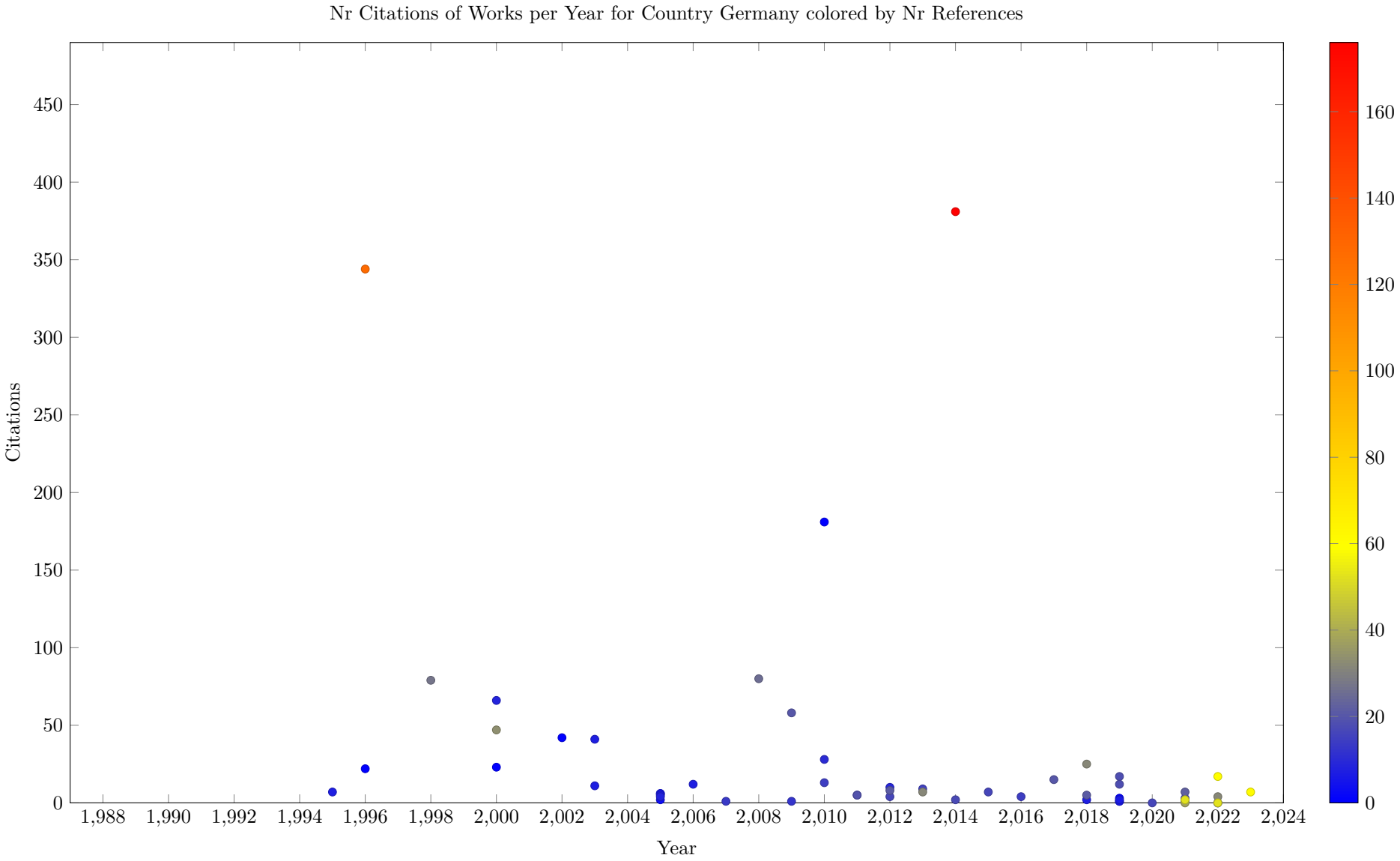
The following plots show for the top 30 countries when the works included were published, and how many citations (OpenCitation count) each paper had. The scatter plots are colored by the number of references (OpenCitation count), this help to identify surveys more easily. The plot gives an indication in which period the work from the country falls, and how influential the published works are. The x and y ranges of all plots are uniform to allow comparison between plots.

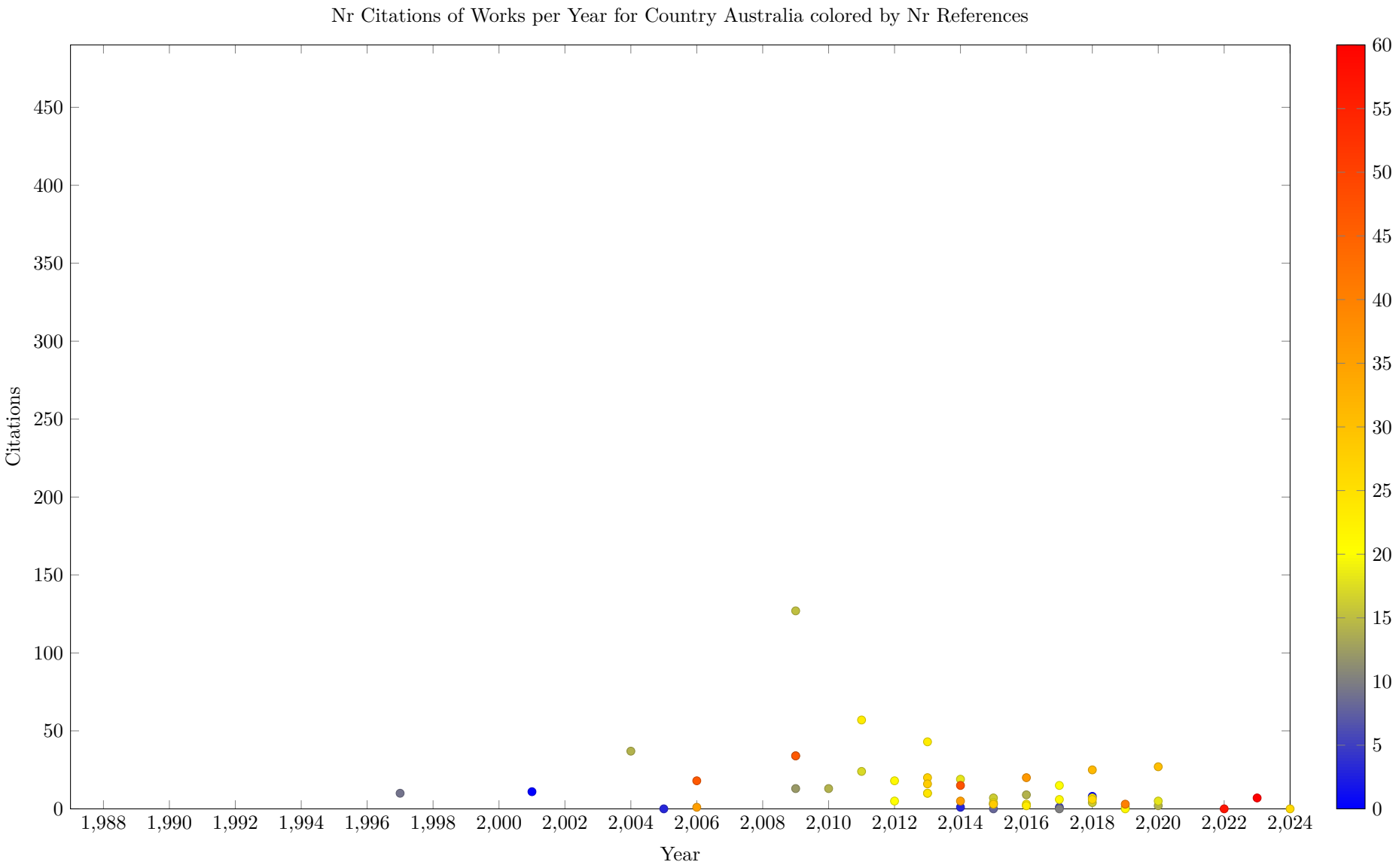
It would be nice to have tooltips on the plots, so identify specific works in the plots. This is currently not supported by the framework library used.

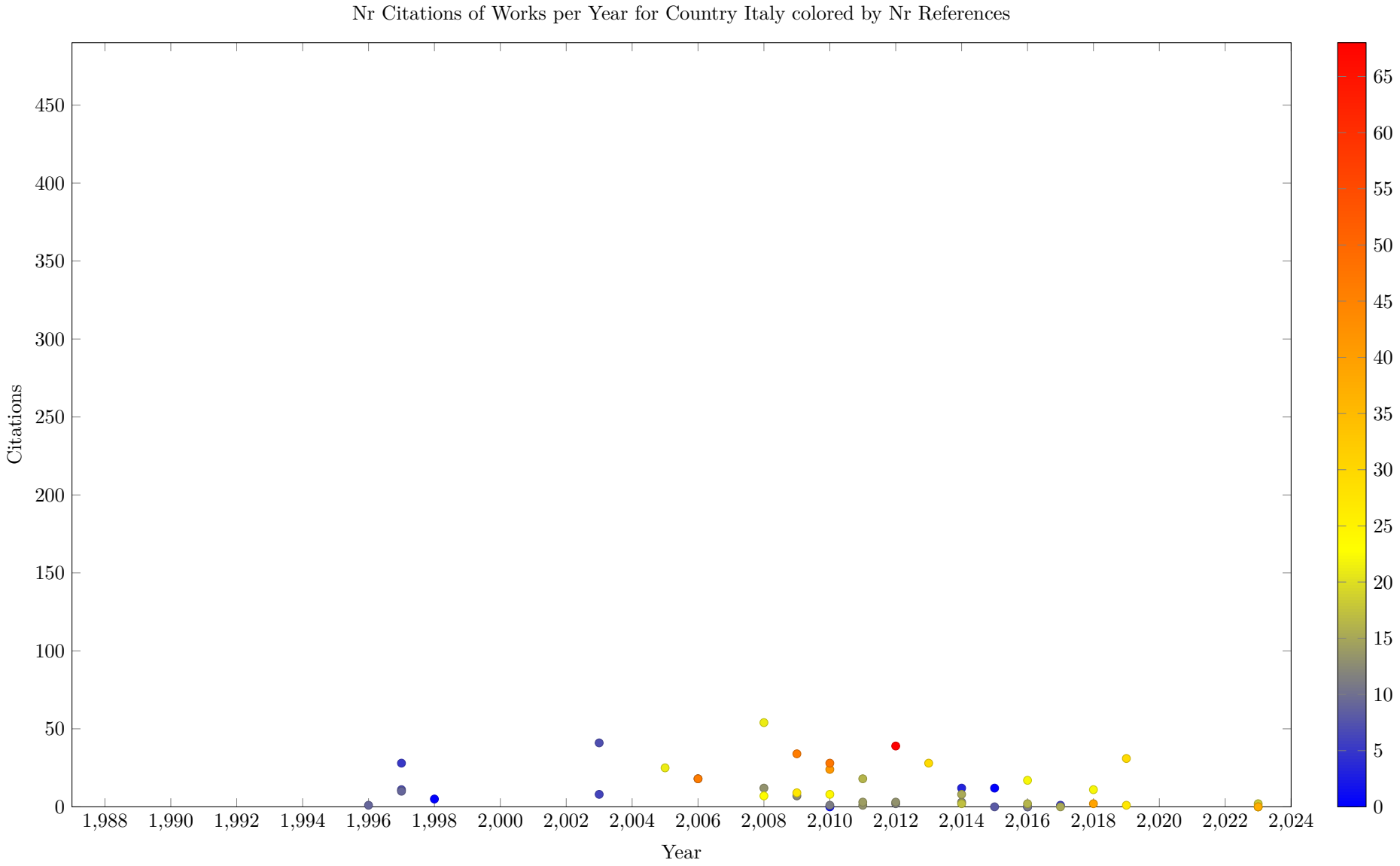

Nr Citations of Works per Year for Country France colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
10
20
30
40
50
60
70

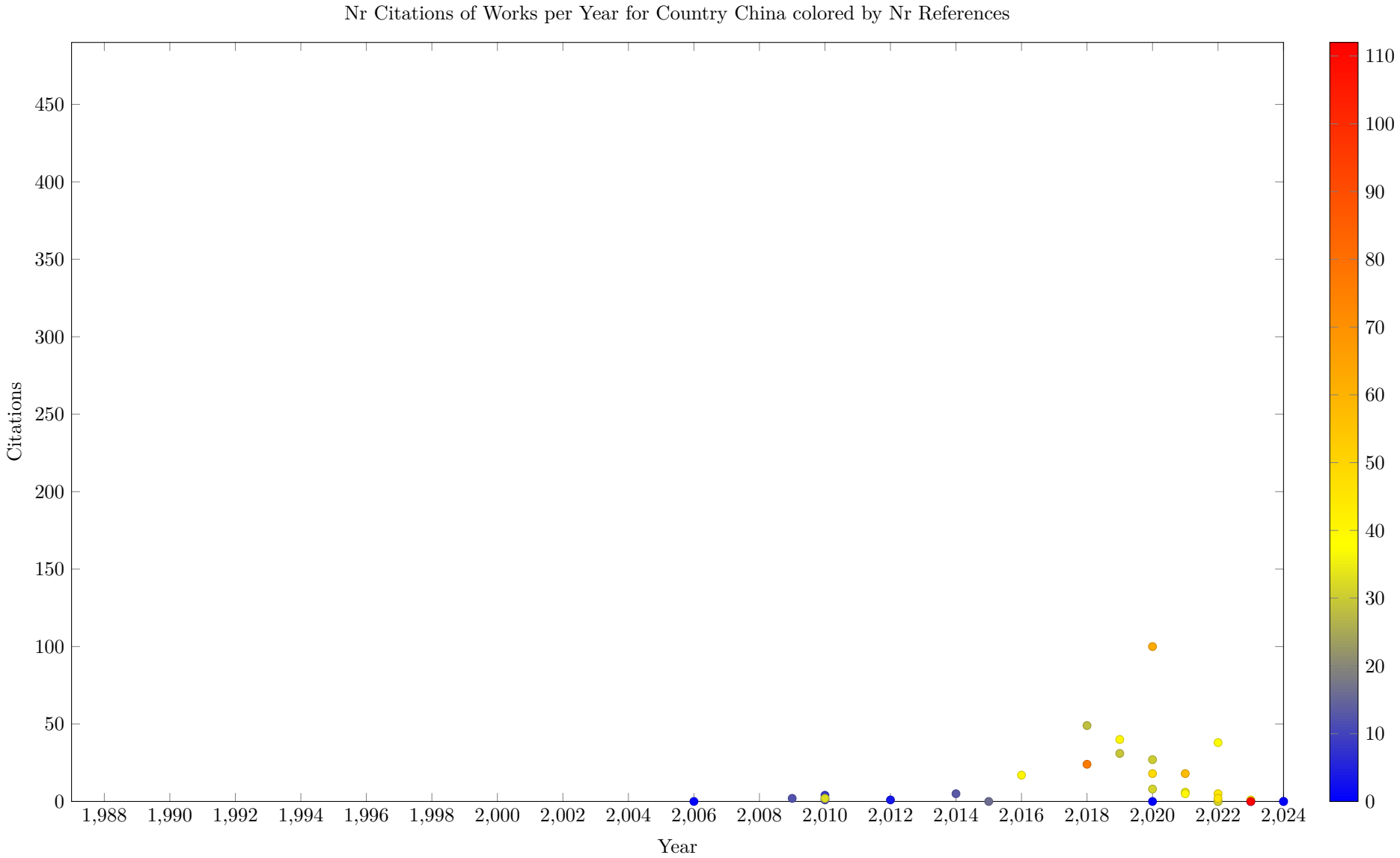

Nr Citations of Works per Year for Country United States colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
50
100
150
200
250
300
350
400

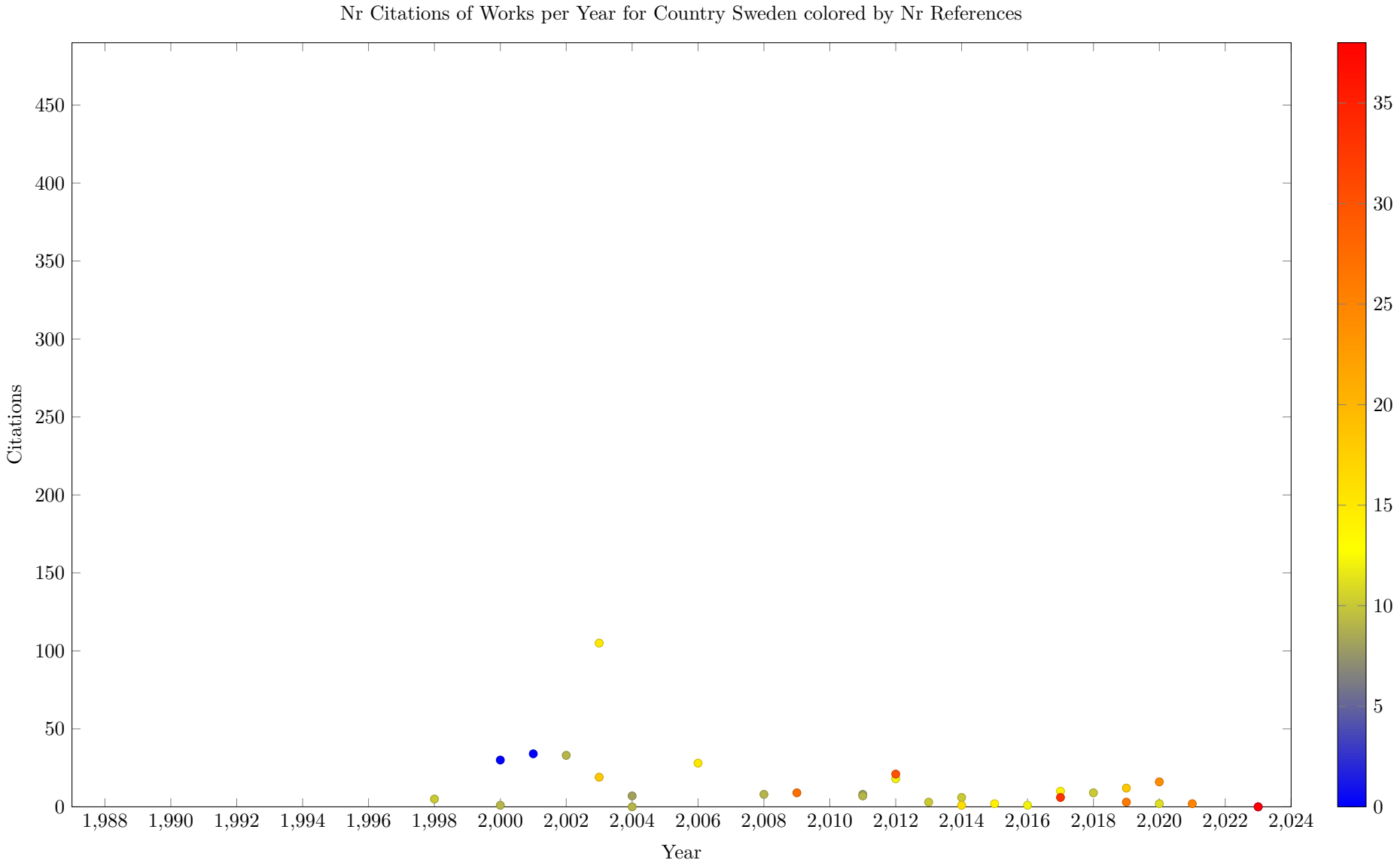

Nr Citations of Works per Year for Country Canada colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70

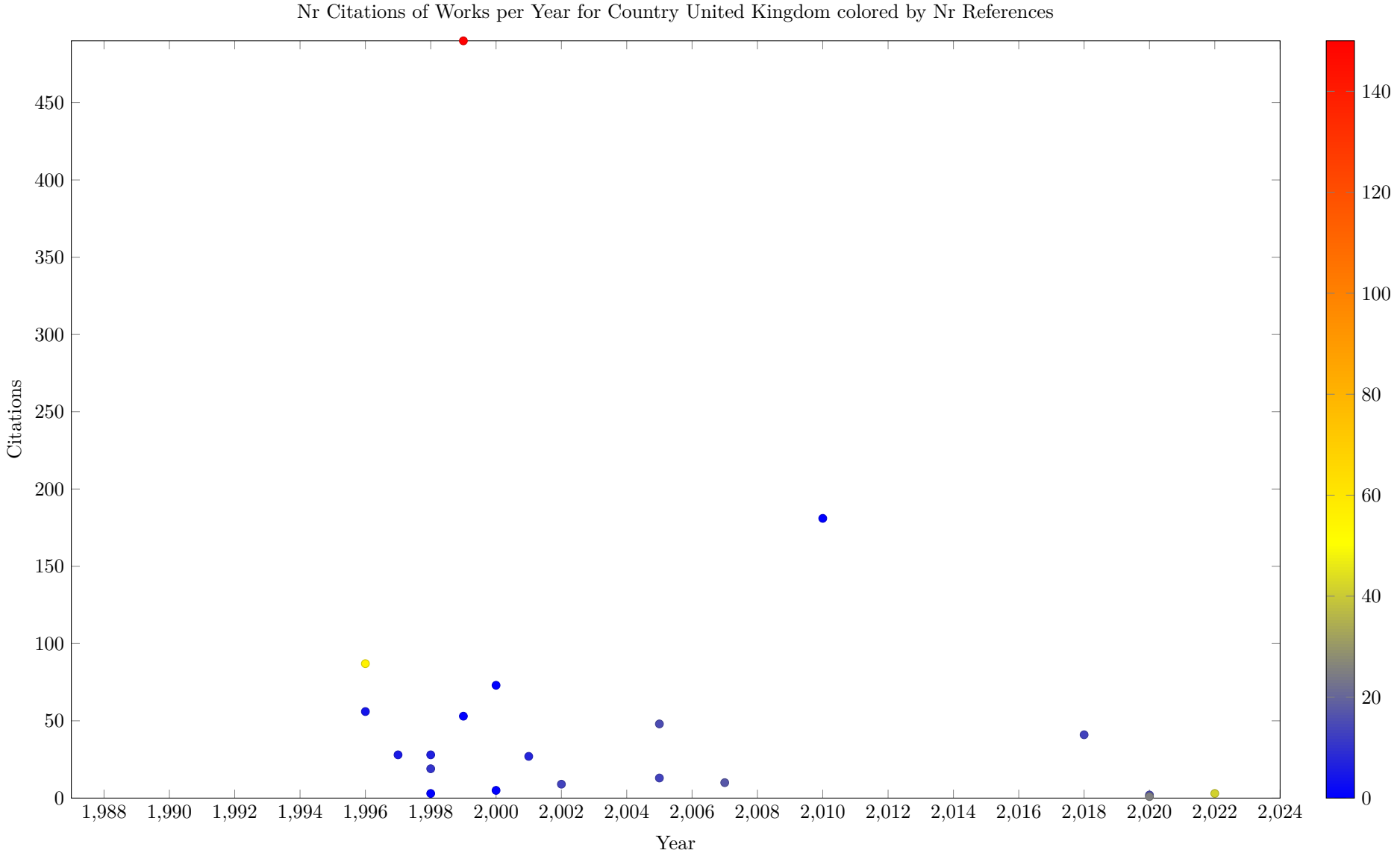

Nr Citations of Works per Year for Country Germany colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
20
40
60
80
100
120
140
160

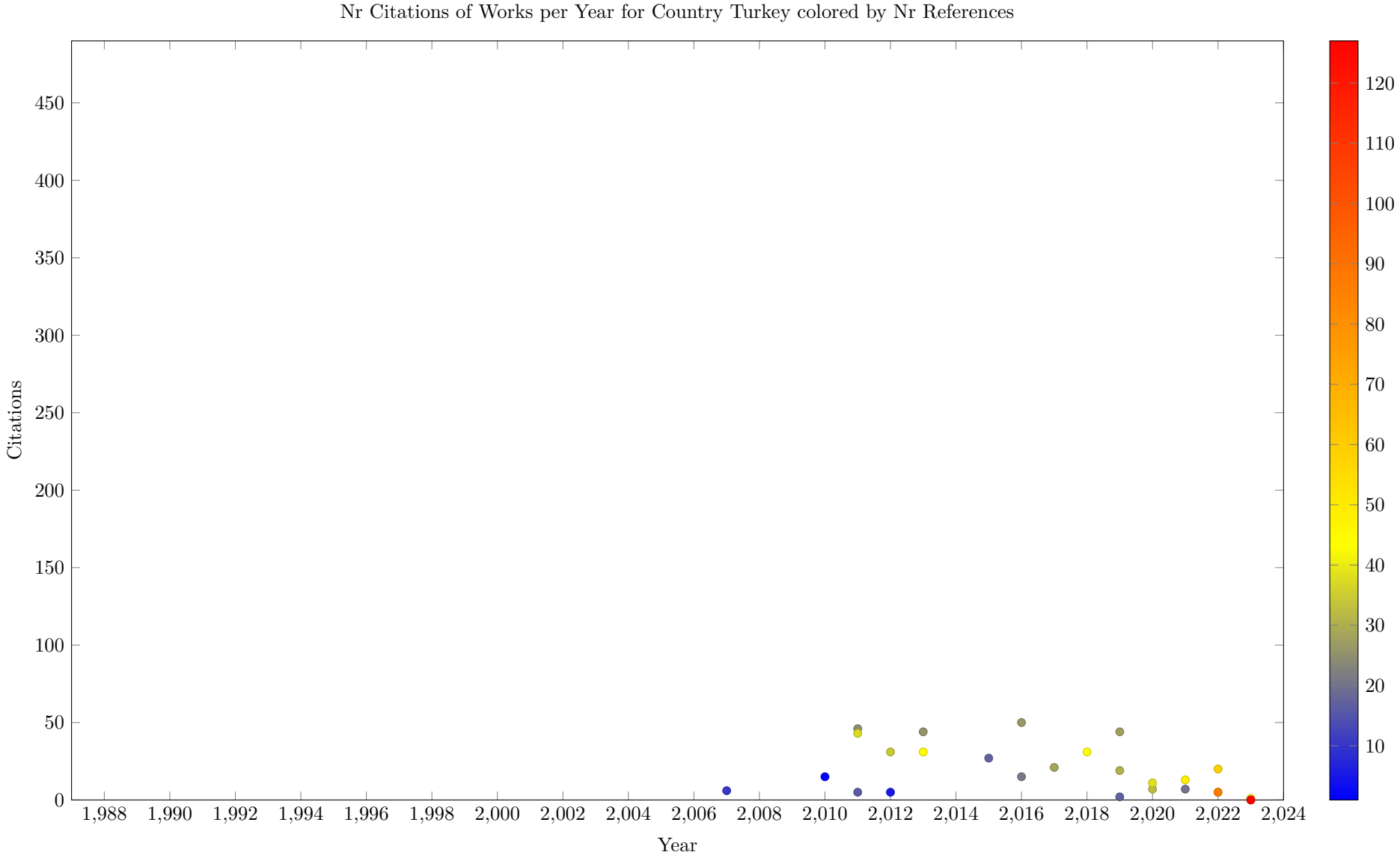

Nr Citations of Works per Year for Country Australia colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45
50
55
60

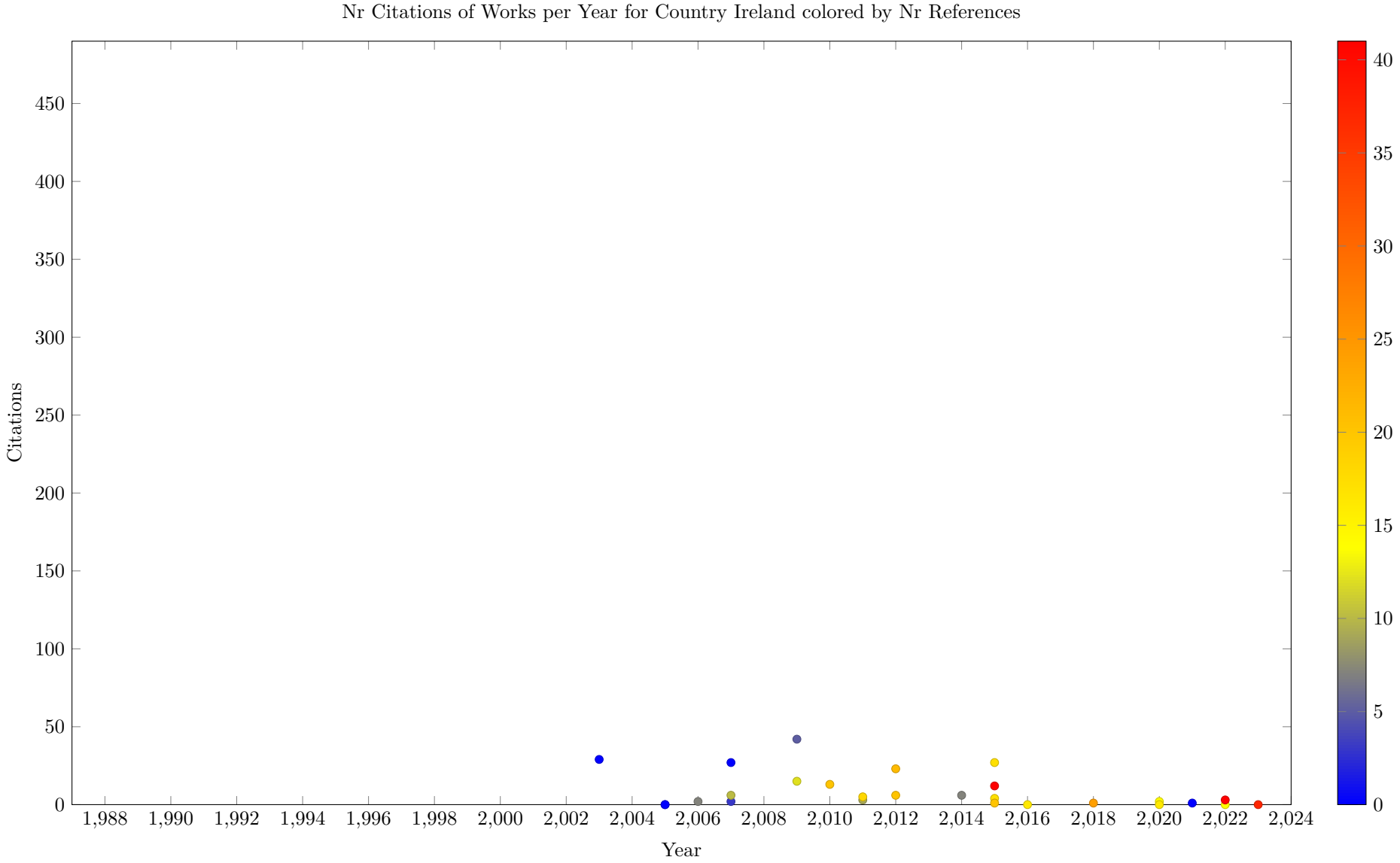

Nr Citations of Works per Year for Country Italy colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45
50
55
60
65

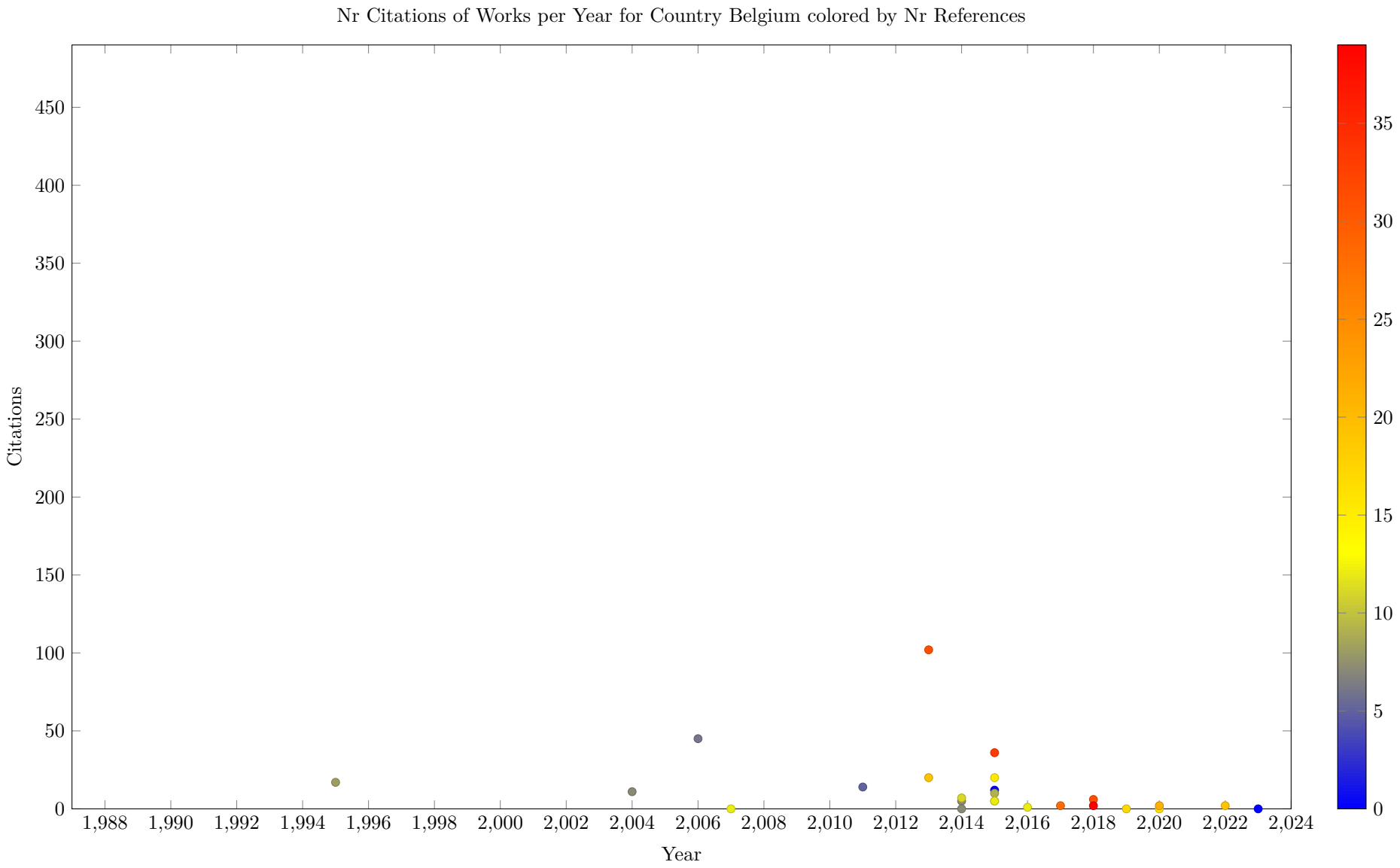

Nr Citations of Works per Year for Country China colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
10
20
30
40
50
60
70
80
90
100
110

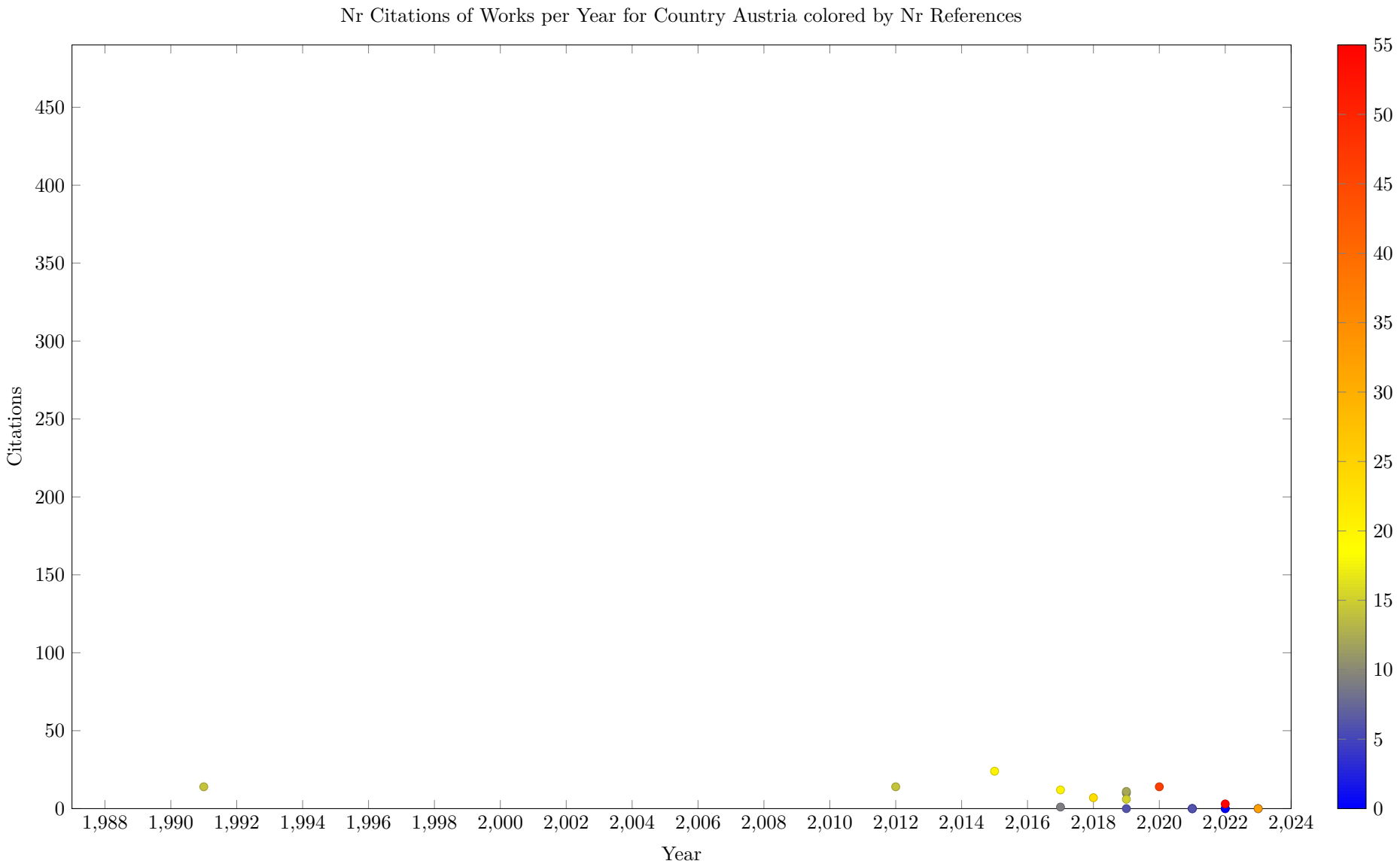

Nr Citations of Works per Year for Country Sweden colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35

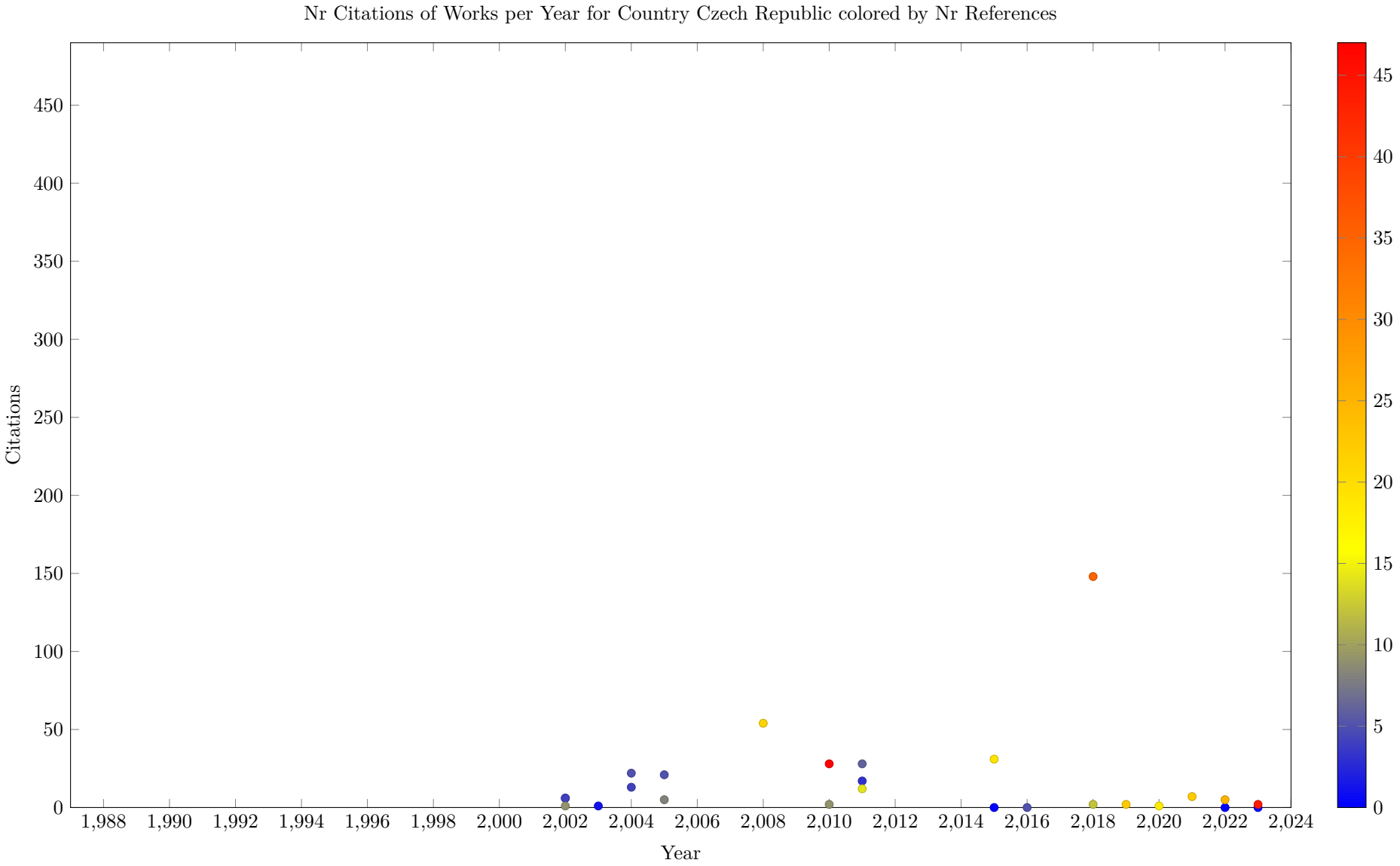

Nr Citations of Works per Year for Country United Kingdom colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
20
40
60
80
100
120
140

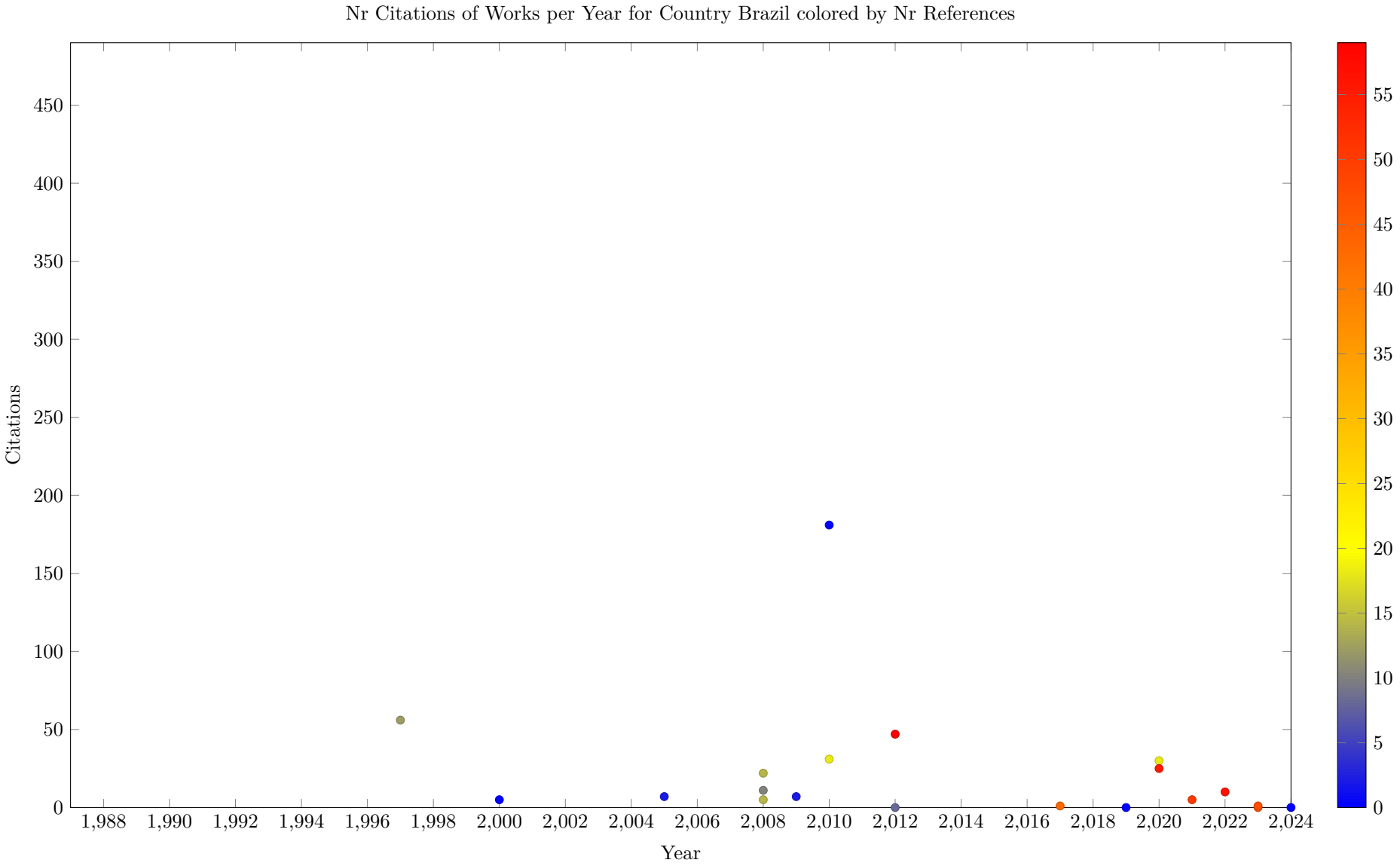

Nr Citations of Works per Year for Country Turkey colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
10
20
30
40
50
60
70
80
90
100
110
120

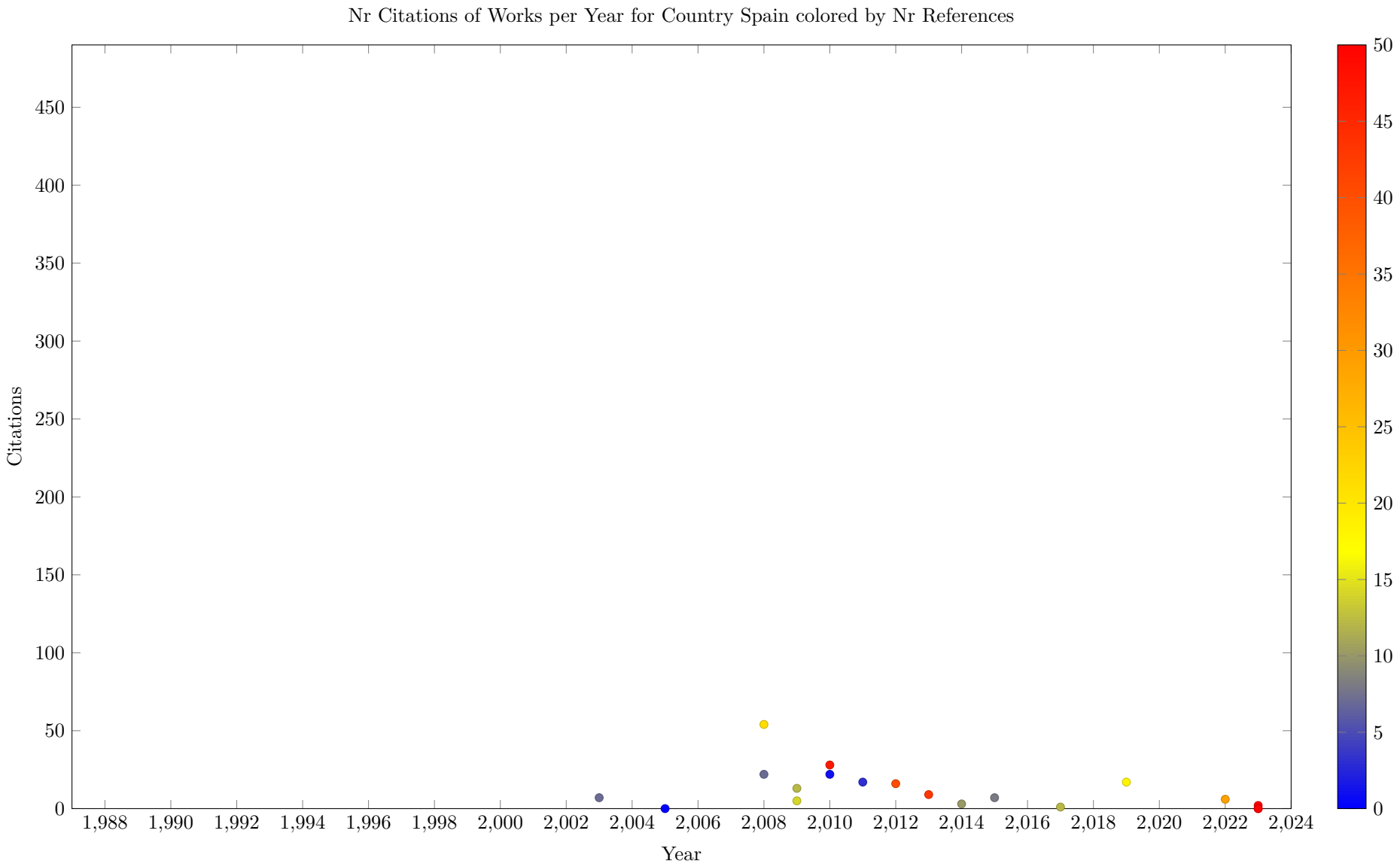

Nr Citations of Works per Year for Country Ireland colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40

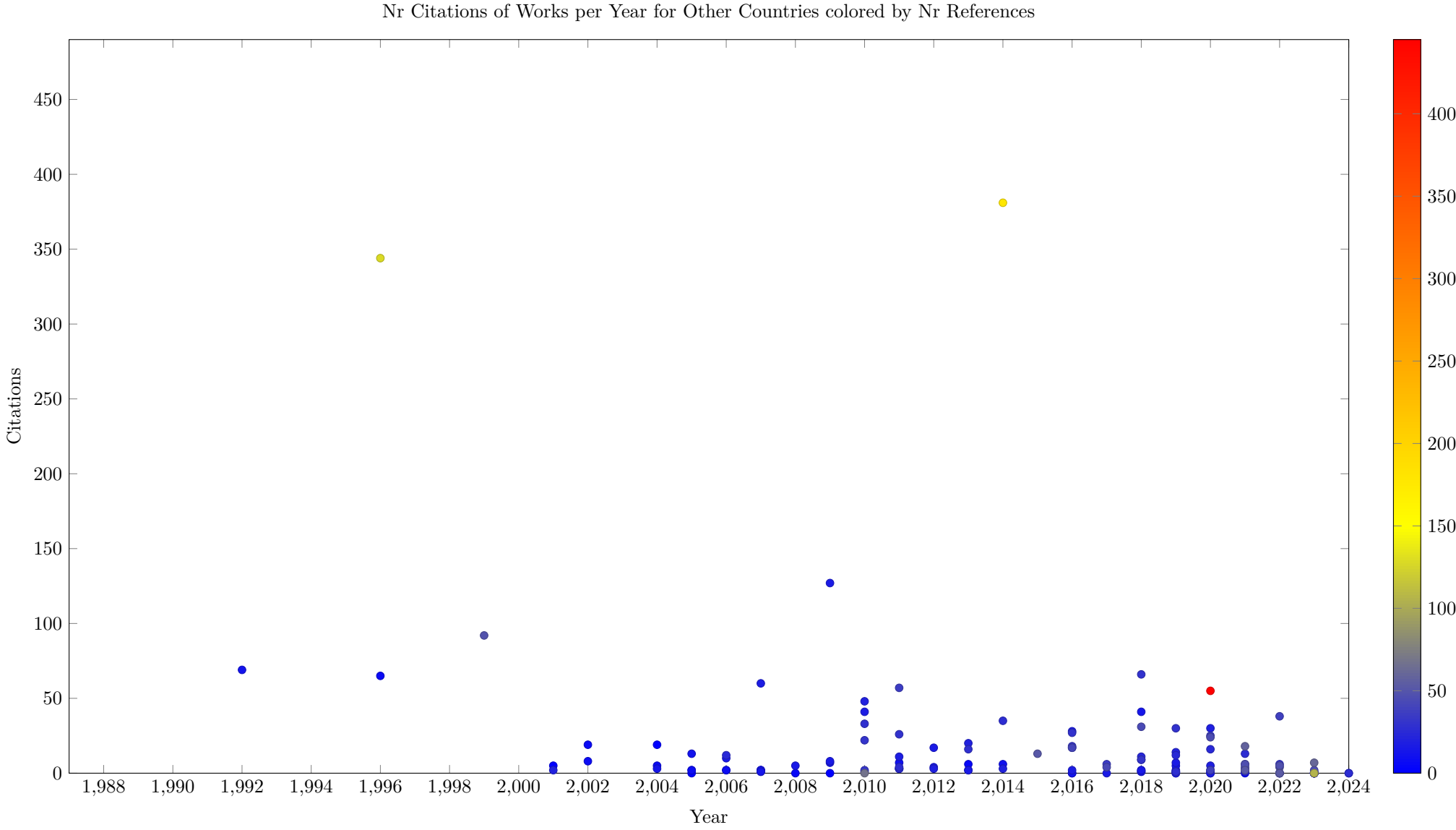

Nr Citations of Works per Year for Country Belgium colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35


Nr Citations of Works per Year for Country Austria colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45
50
55


Nr Citations of Works per Year for Country Czech Republic colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45

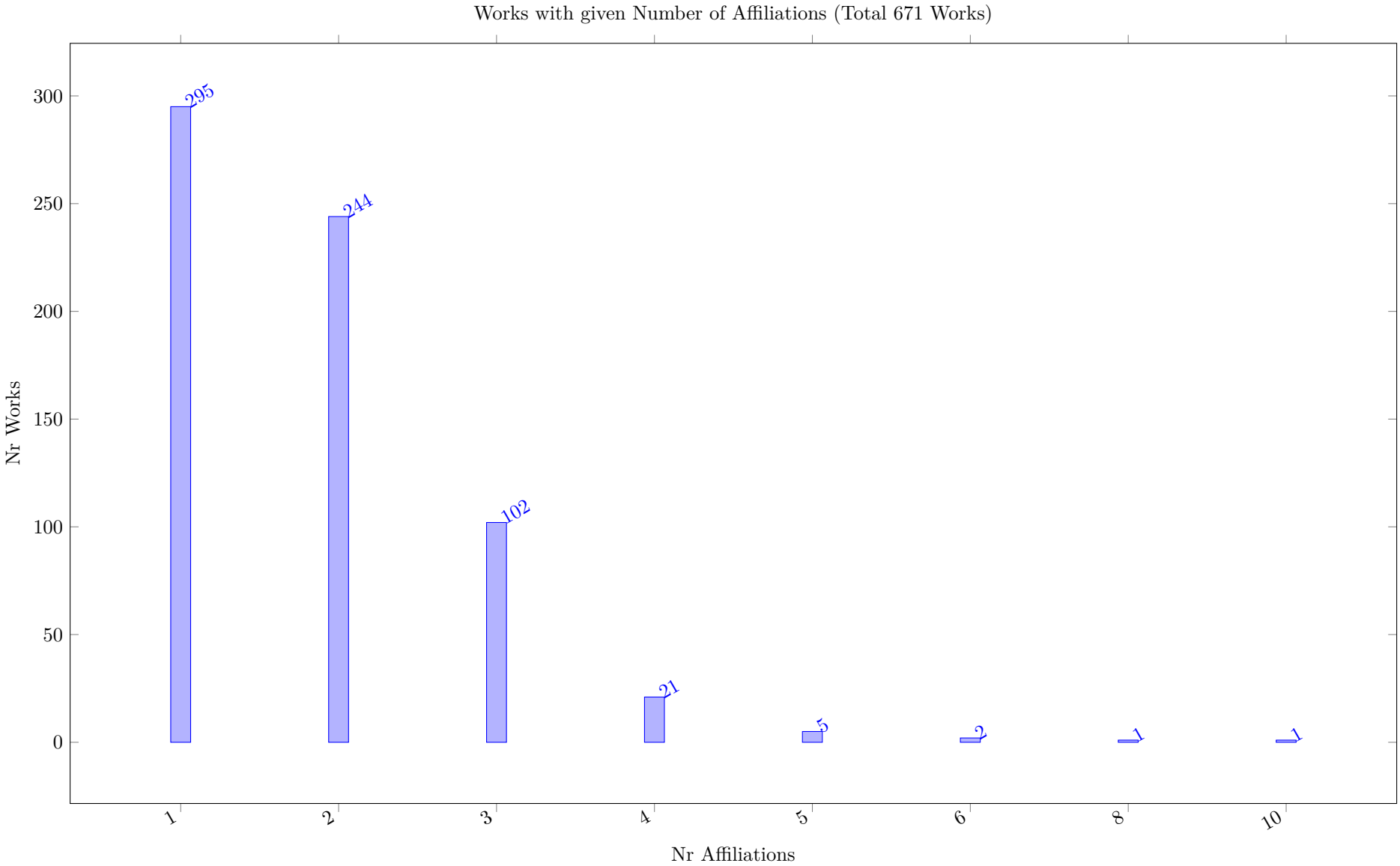

Nr Citations of Works per Year for Country Brazil colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45
50
55


Nr Citations of Works per Year for Country Spain colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
Year
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45
50


Nr Citations of Works per Year for Other Countries colored by Nr References
Citations
Year
0
50
100
150
200
250
300
350
400
450
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
50
100
150
200
250
300
350
400

# 4 Collaborations

This section shows data about collaborations between multiple affiliations for the same work. This is based on Scopus data, which associates the affiliation with the work, not with each author of the work. The analysis excludes background work.




The following heatmap is not complete. It needs a symmetric option to count a collaboration for both A-B and B-A.

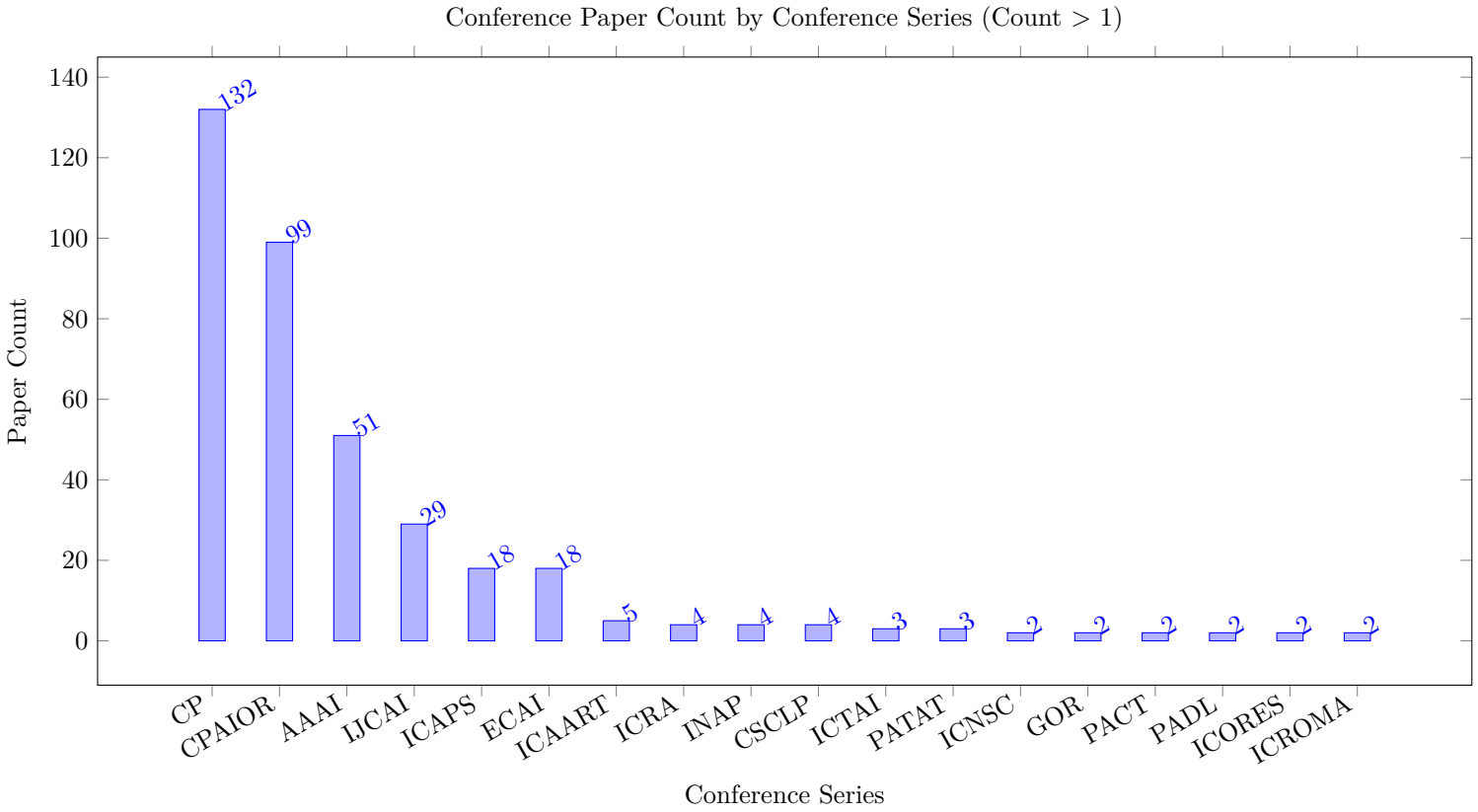
Table 7: Collaboration Data (Top 45 Inst by Decreasing Collab Fraction)

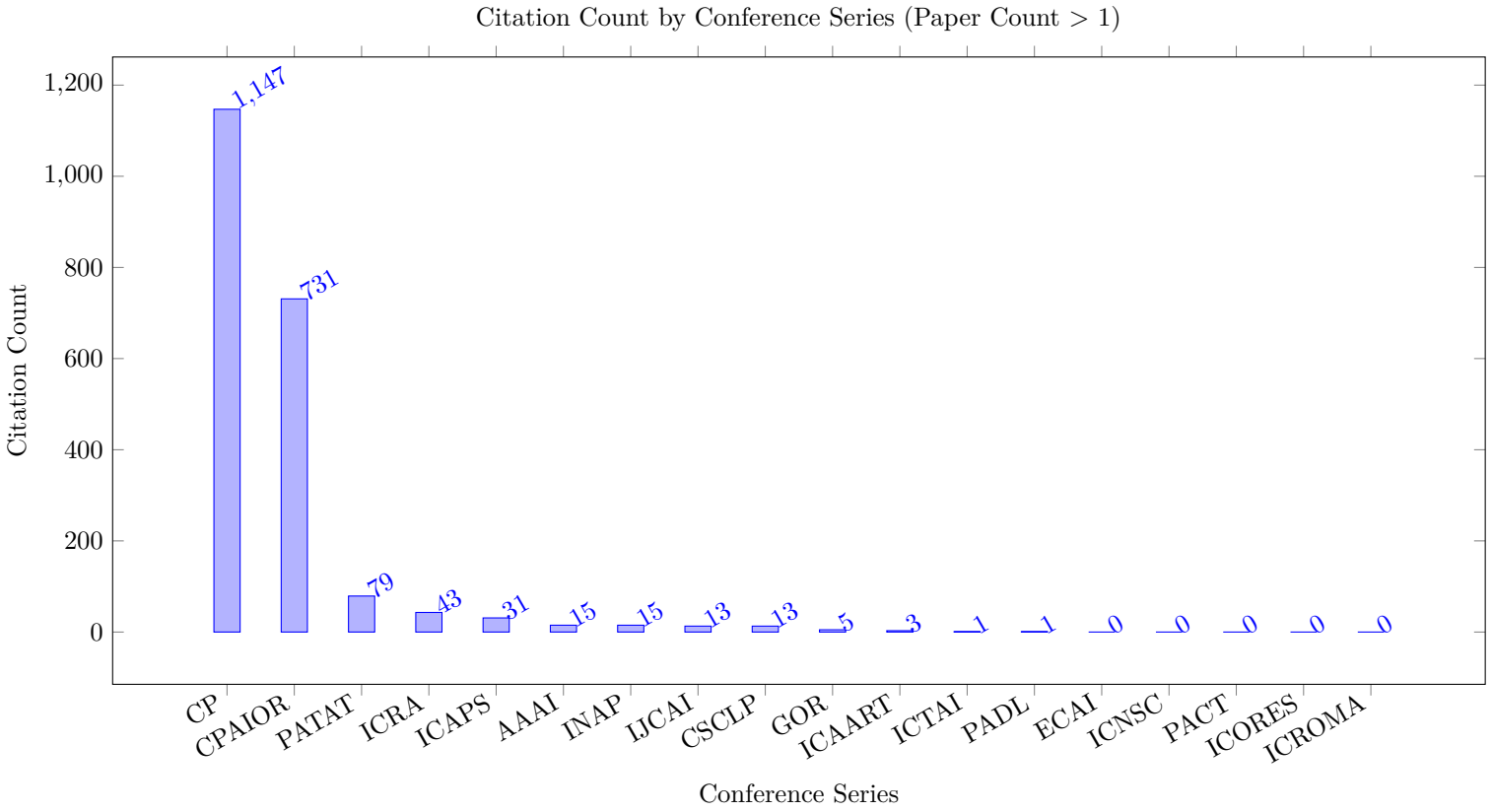
| Inst | Nr Works | Collab Count | Domestic Collab | International Collab | Collab Fraction | Domestic Fraction | International Fraction | Collab Percentage | International Percentage |
|---|---|---|---|---|---|---|---|---|---|
| University of Toronto, Toronto, Canada | 42 | 40 | 18 | 22 | 26.00 | 8.50 | 17.50 | 61.90 | 41.67 |
| Université de Toulouse, Toulouse, France | 28 | 37 | 19 | 18 | 21.00 | 14.83 | 6.17 | 75.00 | 22.02 |
| University of Melbourne, Melbourne, Australia | 25 | 32 | 23 | 9 | 20.00 | 15.00 | 5.00 | 80.00 | 20.00 |
| Monash University, Clayton, Australia | 21 | 28 | 19 | 9 | 19.00 | 13.50 | 5.50 | 90.48 | 26.19 |
| Commonwealth Scientific and Industrial Research Organisation, Canberra, Australia | 18 | 30 | 24 | 6 | 18.00 | 15.00 | 3.00 | 100.00 | 16.67 |
| University College Cork, Cork, Ireland | 22 | 31 | 6 | 25 | 17.00 | 1.76 | 15.24 | 77.27 | 69.26 |
| Alma Mater Studiorum Università di Bologna, Bologna, Italy | 35 | 22 | 6 | 16 | 15.00 | 3.83 | 11.17 | 42.86 | 31.90 |
| Laboratoire d'Analyse et d'Architecture des Systemes, Toulouse, France | 14 | 19 | 14 | 5 | 13.00 | 10.00 | 3.00 | 92.86 | 21.43 |
| IMT Atlantique, Nantes, France | 17 | 15 | 5 | 10 | 13.00 | 4.00 | 9.00 | 76.47 | 52.94 |
| International Business Machines, Armonk, United States | 22 | 16 | 0 | 16 | 12.00 | 0.00 | 12.00 | 54.55 | 54.55 |
| RISE, Swedish Institute of Computer Science, Kista, Sweden | 12 | 14 | 3 | 11 | 10.00 | 2.00 | 8.00 | 83.33 | 66.67 |
| The Royal Institute of Technology (KTH), Stockholm, Sweden | 10 | 20 | 15 | 5 | 10.00 | 7.67 | 2.33 | 100.00 | 23.33 |
| Université Catholique de Louvain, Louvain-la-Neuve, Belgium | 19 | 12 | 2 | 10 | 9.00 | 1.33 | 7.67 | 47.37 | 40.35 |
| Tepper School of Business, Pittsburgh, United States | 22 | 18 | 6 | 12 | 9.00 | 2.33 | 6.67 | 40.91 | 30.30 |
| Polytechnique Montréal, Montreal, Canada | 14 | 10 | 6 | 4 | 8.00 | 5.50 | 2.50 | 57.14 | 17.86 |
| Technische Universität Wien, Vienna, Austria | 9 | 8 | 6 | 2 | 7.00 | 6.00 | 1.00 | 77.78 | 11.11 |
| Dokuz Eylül Üniversitesi, Izmir, Turkey | 9 | 8 | 6 | 2 | 7.00 | 5.00 | 2.00 | 77.78 | 22.22 |
| Rotman School of Management, Toronto, Canada | 7 | 16 | 13 | 3 | 7.00 | 5.50 | 1.50 | 100.00 | 21.43 |
| Charles University, Prague, Czech Republic | 17 | 10 | 4 | 6 | 7.00 | 3.50 | 3.50 | 41.18 | 20.59 |
| Zuse Institute Berlin, Berlin, Germany | 10 | 9 | 6 | 3 | 7.00 | 4.50 | 2.50 | 70.00 | 25.00 |
| Universidade de São Paulo, Sao Paulo, Brazil | 7 | 8 | 4 | 4 | 6.00 | 3.50 | 2.50 | 85.71 | 35.71 |
| Universidad Nacional del Litoral, Santa Fe, Argentina | 12 | 14 | 4 | 10 | 6.00 | 4.00 | 2.00 | 50.00 | 16.67 |
| Université d'Avignon et des Pays du Vaucluse, Avignon, France | 7 | 7 | 5 | 2 | 6.00 | 4.00 | 2.00 | 85.71 | 28.57 |
| Université de Maroua, Maroua, Cameroon | 6 | 10 | 6 | 4 | 6.00 | 3.67 | 2.33 | 100.00 | 38.89 |
| Université Grenoble Alpes, Saint Martin d'Heres, France | 5 | 8 | 7 | 1 | 5.00 | 4.67 | 0.33 | 100.00 | 6.67 |
| University of Connecticut, Storrs, United States | 5 | 8 | 5 | 3 | 5.00 | 3.83 | 1.17 | 100.00 | 23.33 |
| Czech Institute of Informatics, Robotics and Cybernetics, Prague, Czech Republic | 5 | 7 | 3 | 4 | 5.00 | 2.50 | 2.50 | 100.00 | 50.00 |
| University of Tehran, Tehran, Iran | 7 | 7 | 1 | 6 | 5.00 | 1.00 | 4.00 | 71.43 | 57.14 |
| University of Windsor, Windsor, Canada | 5 | 10 | 9 | 1 | 5.00 | 4.50 | 0.50 | 100.00 | 10.00 |
| ABB Corporate Research, Vasteras, Vasteras, Sweden | 5 | 11 | 9 | 2 | 5.00 | 4.00 | 1.00 | 100.00 | 20.00 |
| Compagnie IBM France, Bois-Colombes, France | 8 | 7 | 3 | 4 | 5.00 | 2.00 | 3.00 | 62.50 | 37.50 |
| Technische Universität Berlin, Berlin, Germany | 6 | 13 | 5 | 8 | 5.00 | 3.50 | 1.50 | 83.33 | 25.00 |
| Magyar Tudomanyos Akademia, Budapest, Hungary | 8 | 6 | 0 | 6 | 5.00 | 0.00 | 5.00 | 62.50 | 62.50 |
| Bouygues, Paris, France | 7 | 5 | 3 | 2 | 5.00 | 3.00 | 2.00 | 71.43 | 28.57 |
| Université Laval, Quebec, Canada | 9 | 9 | 2 | 7 | 4.00 | 1.00 | 3.00 | 44.44 | 33.33 |
| UNSW Sydney, Sydney, Australia | 5 | 9 | 3 | 6 | 4.00 | 2.00 | 2.00 | 80.00 | 40.00 |
| Brown University, Providence, United States | 6 | 10 | 4 | 6 | 4.00 | 2.53 | 1.47 | 66.67 | 24.44 |
| Universidade Federal do Ceará, Fortaleza, Brazil | 4 | 5 | 4 | 1 | 4.00 | 3.50 | 0.50 | 100.00 | 12.50 |
| Universidad Andrés Bello, Santiago, Chile | 4 | 11 | 6 | 5 | 4.00 | 2.40 | 1.60 | 100.00 | 40.00 |
| Alpen-Adria-Universität Klagenfurt, Klagenfurt, Austria | 6 | 5 | 5 | 0 | 4.00 | 4.00 | 0.00 | 66.67 | 0.00 |
| Universitat Politècnica de València, Valencia, Spain | 8 | 7 | 0 | 7 | 4.00 | 0.00 | 4.00 | 50.00 | 50.00 |
| CNRS Centre National de la Recherche Scientifique, Paris, France | 6 | 5 | 2 | 3 | 4.00 | 2.00 | 2.00 | 66.67 | 33.33 |
| Uppsala Universitet, Uppsala, Sweden | 4 | 9 | 4 | 5 | 4.00 | 1.00 | 3.00 | 100.00 | 75.00 |
| Aarhus Universitet, Aarhus, Denmark | 4 | 4 | 0 | 4 | 4.00 | 0.00 | 4.00 | 100.00 | 100.00 |
| Huazhong University of Science and Technology, Wuhan, China | 4 | 10 | 8 | 2 | 4.00 | 3.17 | 0.83 | 100.00 | 20.83 |

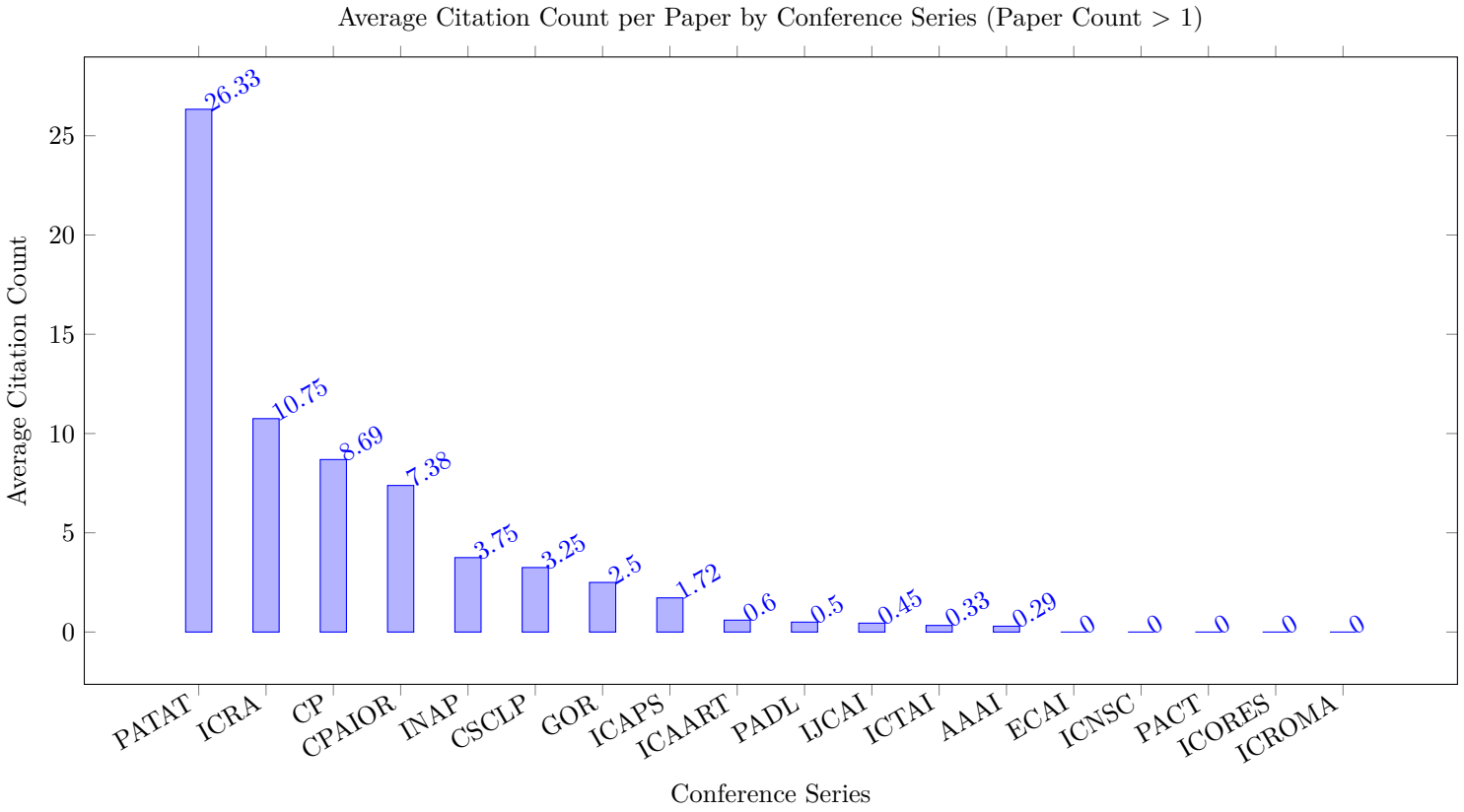
Table 8: Heat Map based on Collaboration between Institutions (Integer Count)

| From/To | Total | France | United States | Canada | Australia | Germany | Sweden | China | Ireland | Italy | Belgium | Netherlands | Chile | Turkey | Austria | Argentina | Brazil | Spain | United Kingdom | Norway | Czech Republic | Cameroon | Colombia | Iran | Tunisia | Russian Federation | South Korea | Luxembourg | Denmark | Singapore | Switzerland | Hong Kong | Egypt | Algeria | Japan | Serbia | Macao | Hungary | Mexico | Poland | Finland | Portugal | Greece | Taiwan | Saudi Arabia | Pakistan | Iceland | Iraq | Romania | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | | 111 | 93 | 79 | 61 | 54 | 54 | 53 | 37 | 28 | 23 | 20 | 17 | 17 | 14 | 14 | 13 | 11 | 11 | 10 | 9 | 9 | 9 | 8 | 7 | 7 | 6 | 6 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | |
| United States | 133 | 6 | 42 | 11 | 3 | 4 | 7 | 5 | 14 | 4 | 9 | 8 | 3 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| France | 121 | 72 | 7 | 5 | 2 | 2 | 8 | 1 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 3 | 0 | 0 | 1 | 3 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Canada | 64 | 1 | 1 | 51 | 0 | 4 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Australia | 61 | 1 | 0 | 1 | 42 | 3 | 0 | 2 | 1 | 4 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Germany | 60 | 2 | 9 | 1 | 5 | 25 | 1 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| China | 43 | 0 | 3 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Italy | 32 | 2 | 2 | 0 | 3 | 2 | 2 | 2 | 1 | 10 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ireland | 31 | 8 | 4 | 3 | 0 | 2 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sweden | 29 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turkey | 21 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Belgium | 20 | 6 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spain | 18 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chile | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic | 15 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Austria | 14 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Norway | 13 | 5 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cameroon | 13 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | 12 | 0 | 4 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Russian Federation | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Portugal | 8 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Denmark | 7 | 0 | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hungary | 7 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United Kingdom | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Singapore | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Switzerland | 6 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Argentina | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Taiwan | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pakistan | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| Iran | 4 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Korea | 4 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Egypt | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tunisia | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Japan | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poland | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United Arab Emirates | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Finland | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Romania | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Algeria | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Israel | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hong Kong | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mexico | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greece | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Thailand | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saudi Arabia | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |

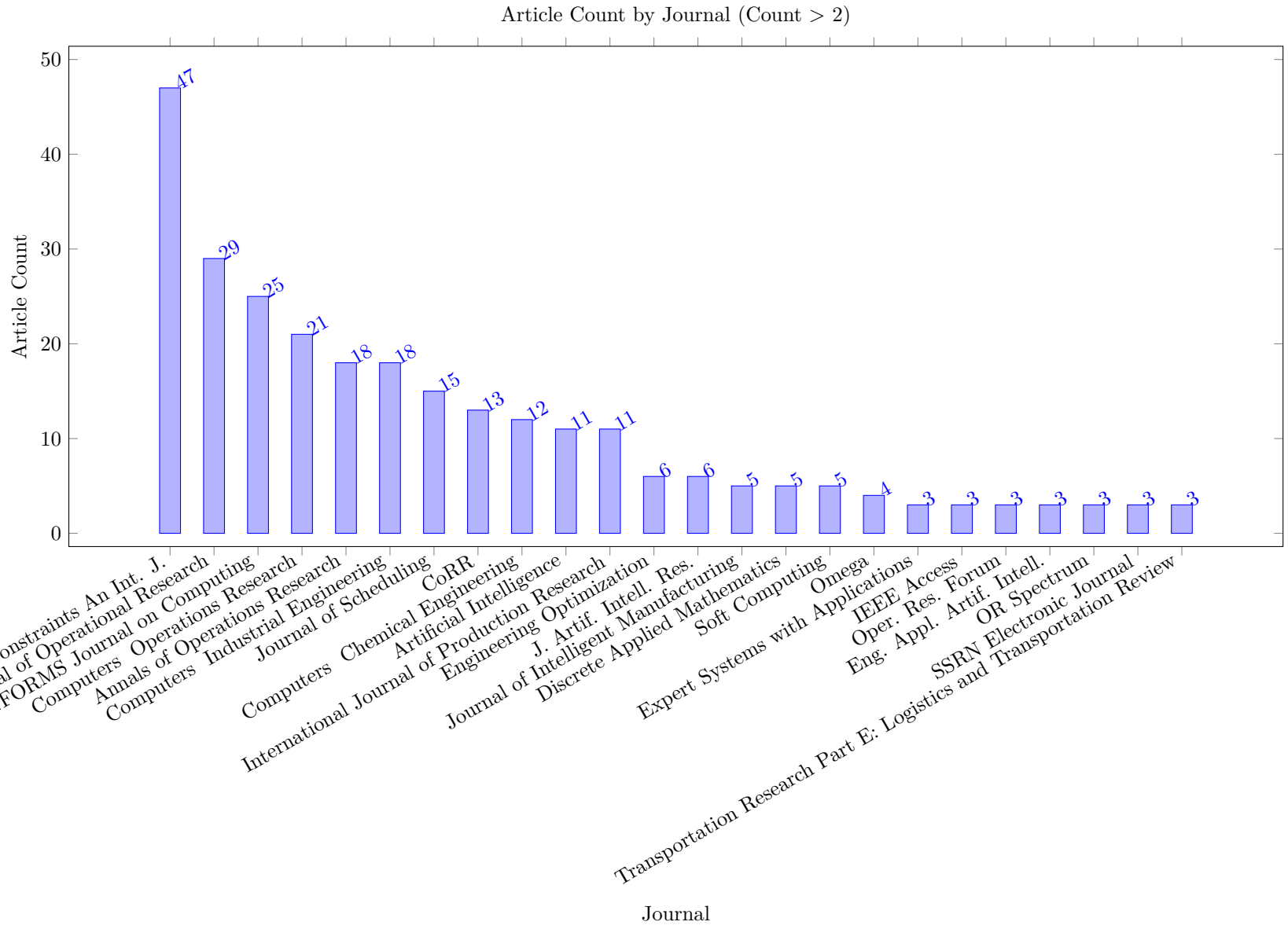
# 5 Conference Papers by Most Common Conference Series

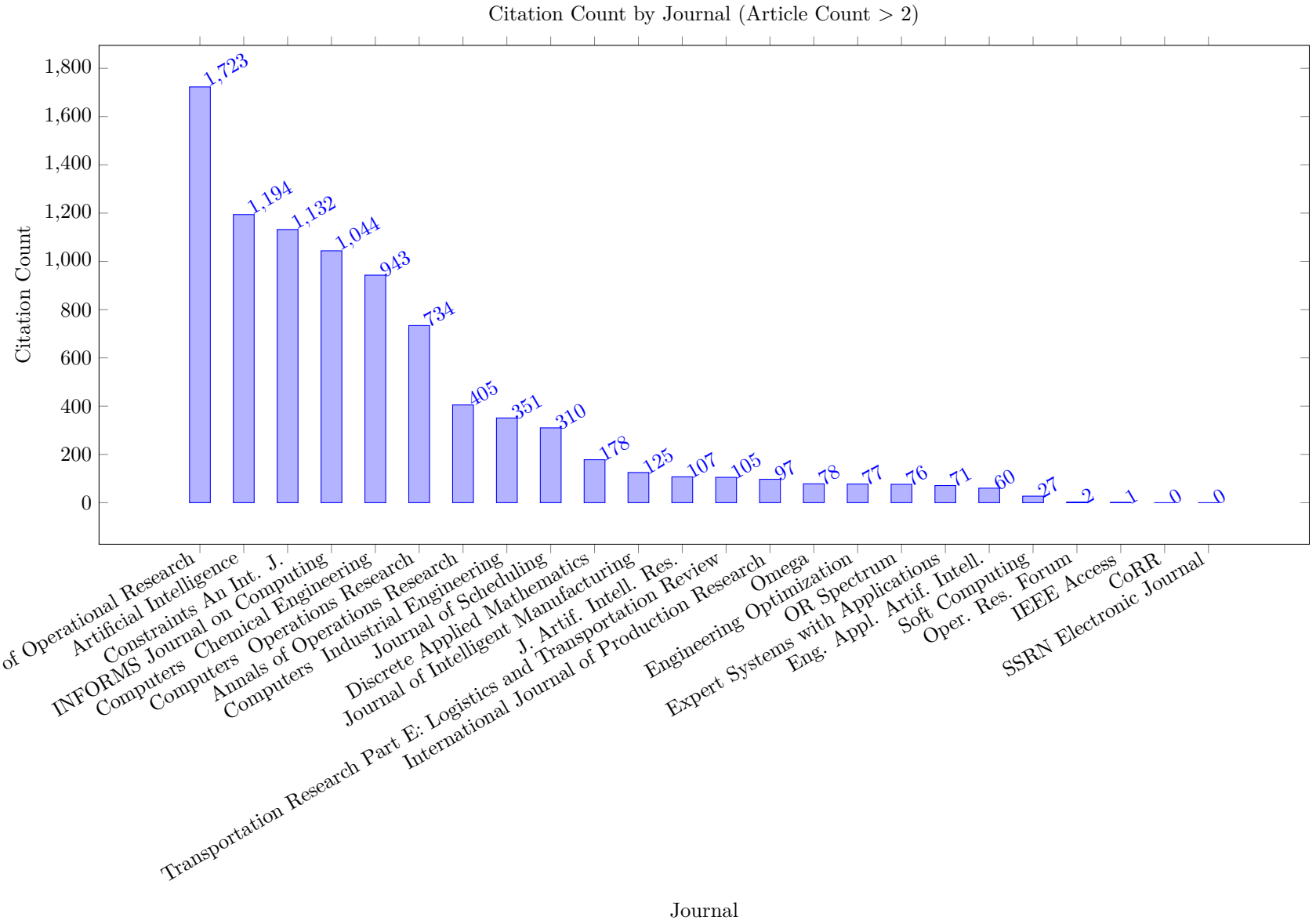


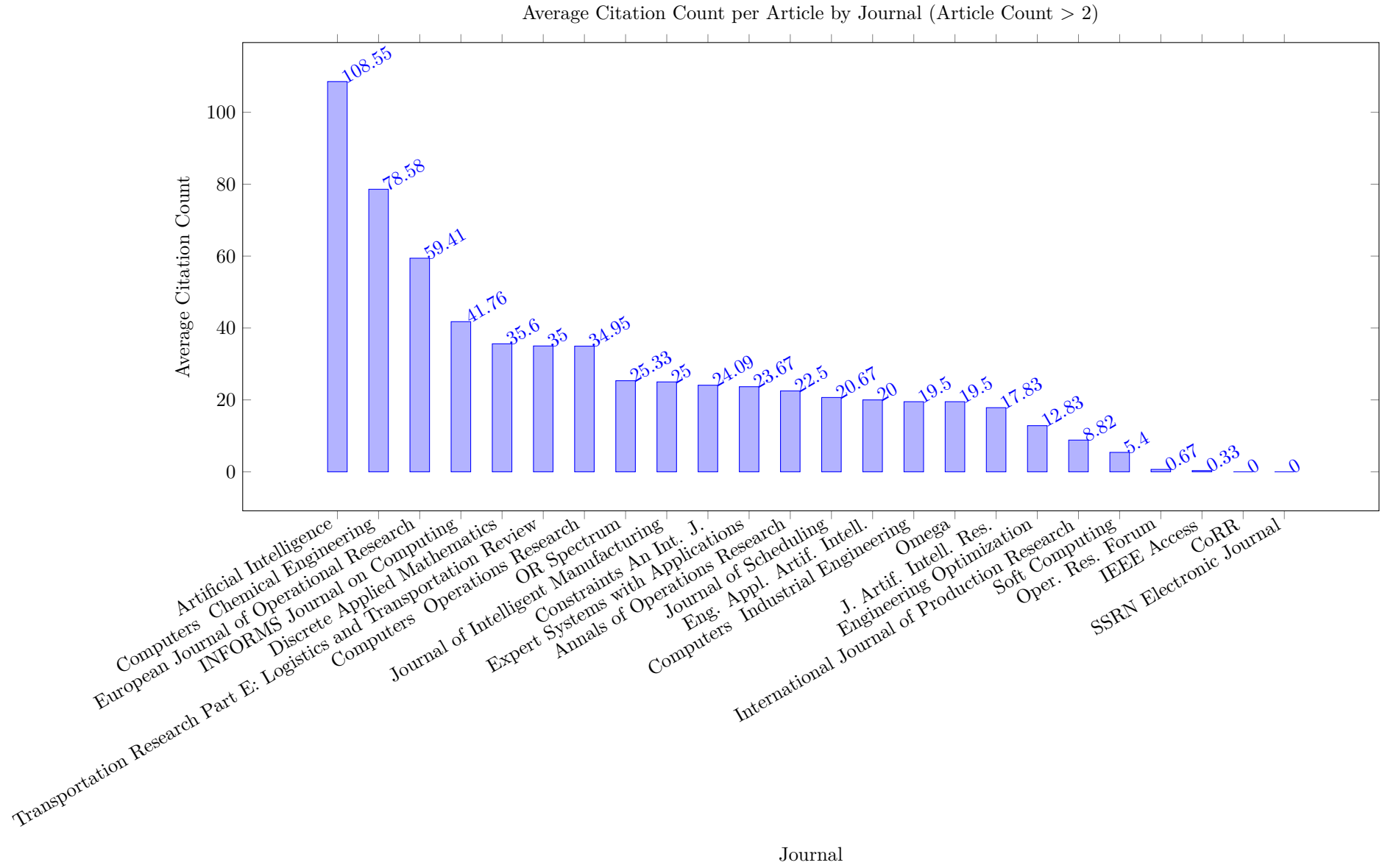

Citation Count by Conference Series (Paper Count > 1)
Citation Count
1,200
1,000
800
600
400
200
0
1,147
731
79
43
31
15
15
13
13
5
3
1
1
0
0
0
0
0
CP
CPAIOR
PATAT
ICRA
ICAPS
AAAI
INAP
IJCAI
CSCLP
GOR
ICAART
ICTAI
PADL
ECAI
ICNSC
PACT
ICORES
ICROMA
Conference Series


Average Citation Count per Paper by Conference Series (Paper Count > 1)
Average Citation Count
0
5
10
15
20
25
26.33
10.75
8.69
7.38
3.75
3.25
2.5
1.72
0.6
0.5
0.45
0.33
0.29
0
0
0
0
0
PATAT
ICRA
CP
CPAIOR
INAP
CSCLP
GOR
ICAPS
ICAART
PADL
IJCAI
ICTAI
AAAI
ECAI
ICNSC
PACT
ICORES
ICROMA
Conference Series

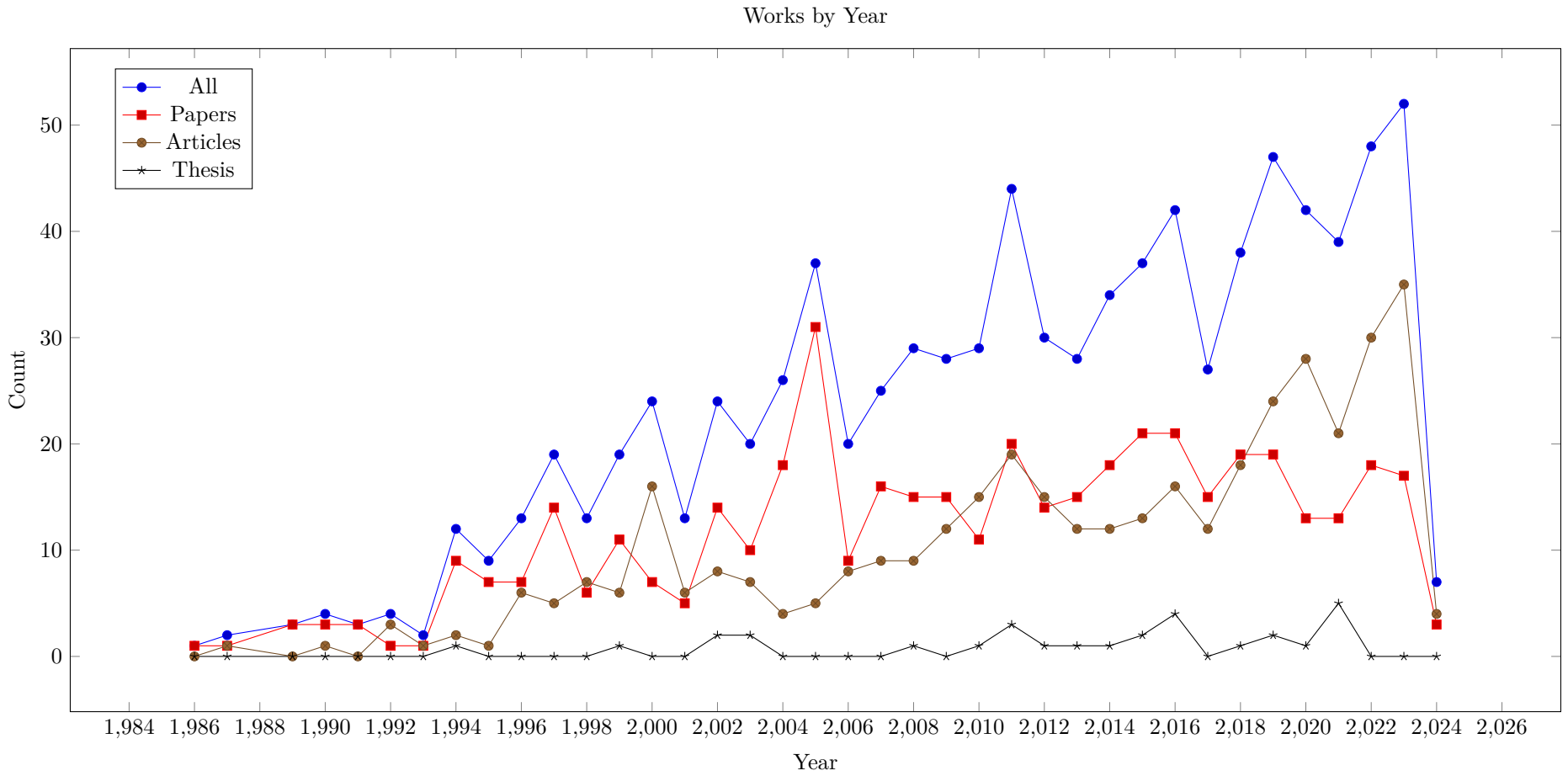
## 6 Journal Articles by Most Common Journals

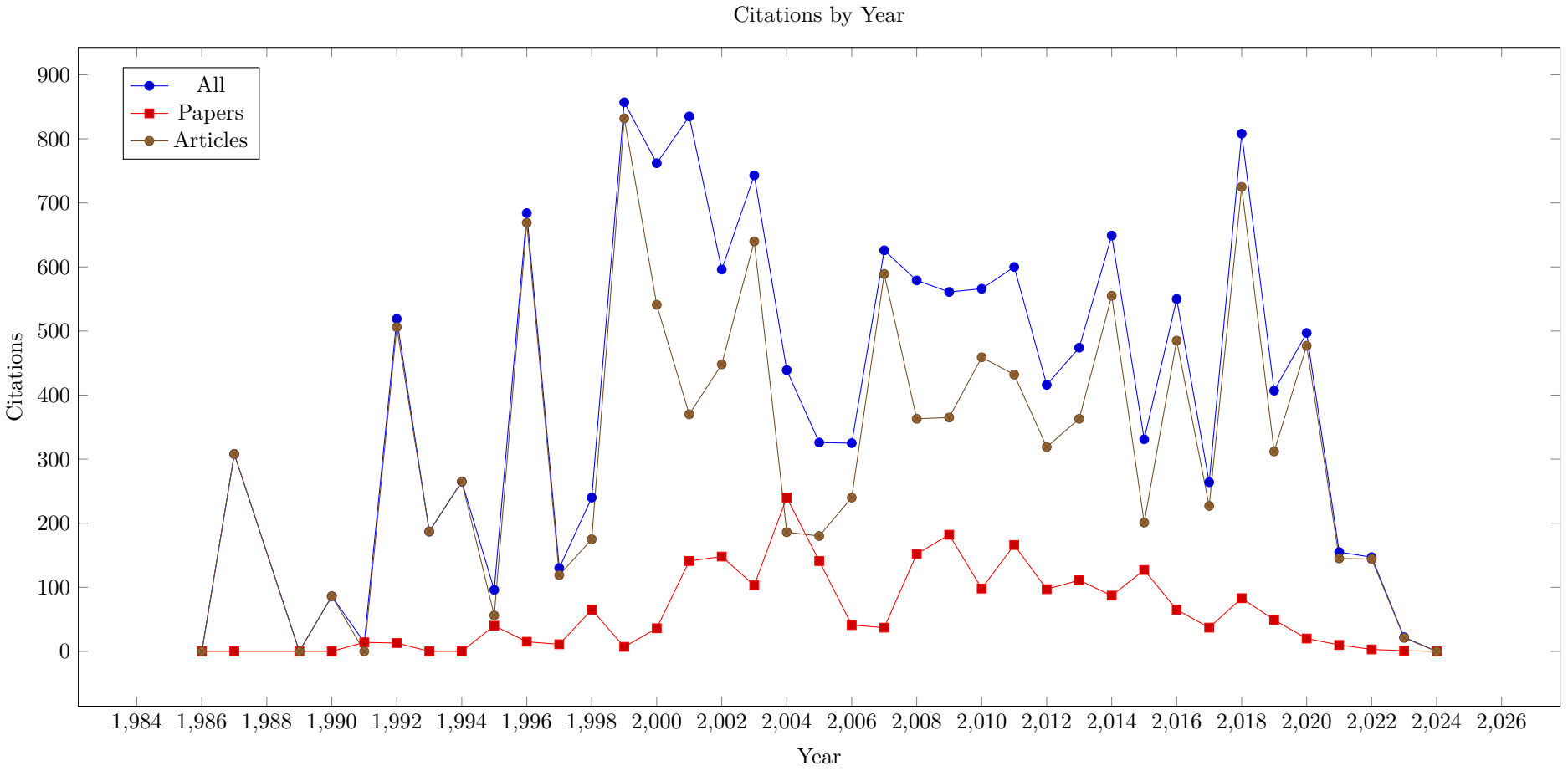


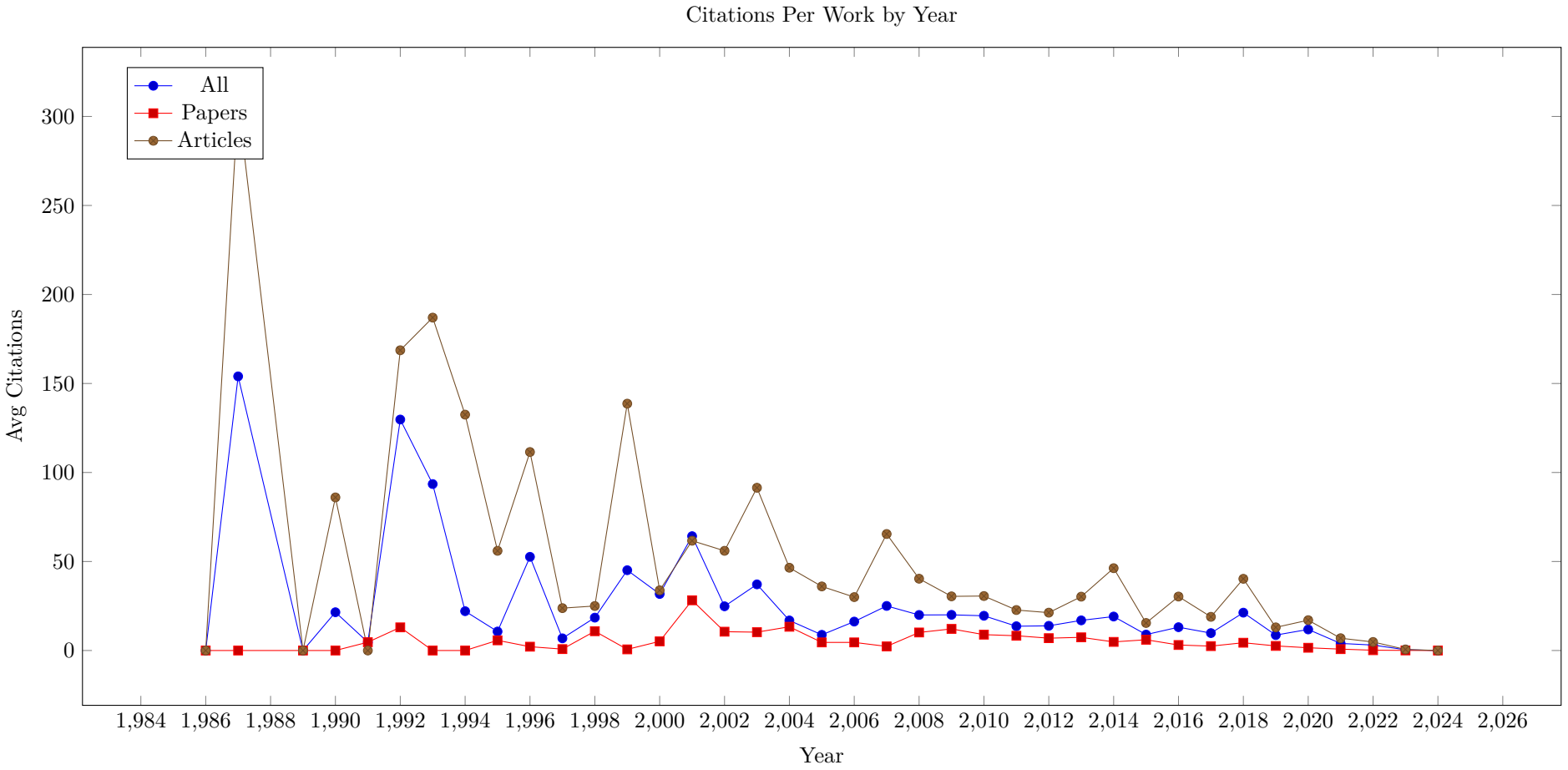

Citation Count by Journal (Article Count > 2)
Citation Count
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
1,723
1,194
1,132
1,044
943
734
405
351
310
178
125
107
105
97
78
77
76
71
60
27
2
1
0
0
European Journal of Operational Research
Artificial Intelligence
Constraints An Int. J.
INFORMS Journal on Computing
Computers Chemical Engineering
Computers Operations Research
Annals of Operations Research
Computers Industrial Engineering
Journal of Scheduling
Discrete Applied Mathematics
Journal of Intelligent Manufacturing
J. Artif. Intell. Res.
Transportation Research Part E: Logistics and Transportation Review
International Journal of Production Research
Omega
Engineering Optimization
OR Spectrum
Expert Systems with Applications
Eng. Appl. Artif. Intell.
Soft Computing
Oper. Res. Forum
IEEE Access
CoRR
SSRN Electronic Journal
Journal


Average Citation Count per Article by Journal (Article Count > 2)
Average Citation Count
0
20
40
60
80
100
108.55
78.58
59.41
41.76
35.6
35
34.95
25.33
25
24.09
23.67
22.5
20.67
20
19.5
19.5
17.83
12.83
8.82
5.4
0.67
0.33
0
0
Artificial Intelligence
Computers Chemical Engineering
European Journal of Operational Research
INFORMS Journal on Computing
Discrete Applied Mathematics
Transportation Research Part E: Logistics and Transportation Review
Computers Operations Research
OR Spectrum
Journal of Intelligent Manufacturing
Constraints An Int. J.
Expert Systems with Applications
Annals of Operations Research
Journal of Scheduling
Eng. Appl. Artif. Intell.
Computers Industrial Engineering
Omega
J. Artif. Intell. Res.
Engineering Optimization
International Journal of Production Research
Soft Computing
Oper. Res. Forum
IEEE Access
CoRR
SSRN Electronic Journal
Journal

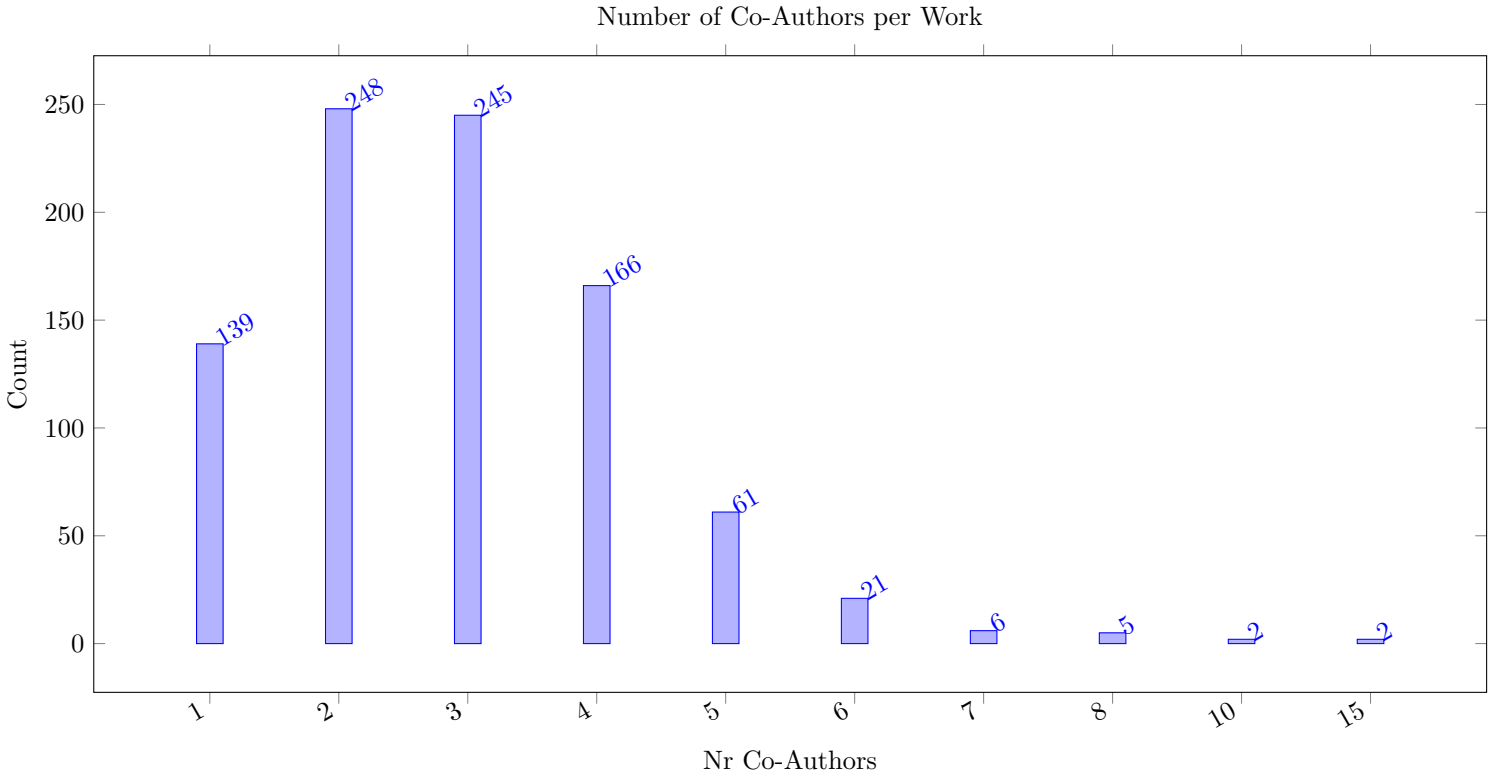
# 7 Works by Year



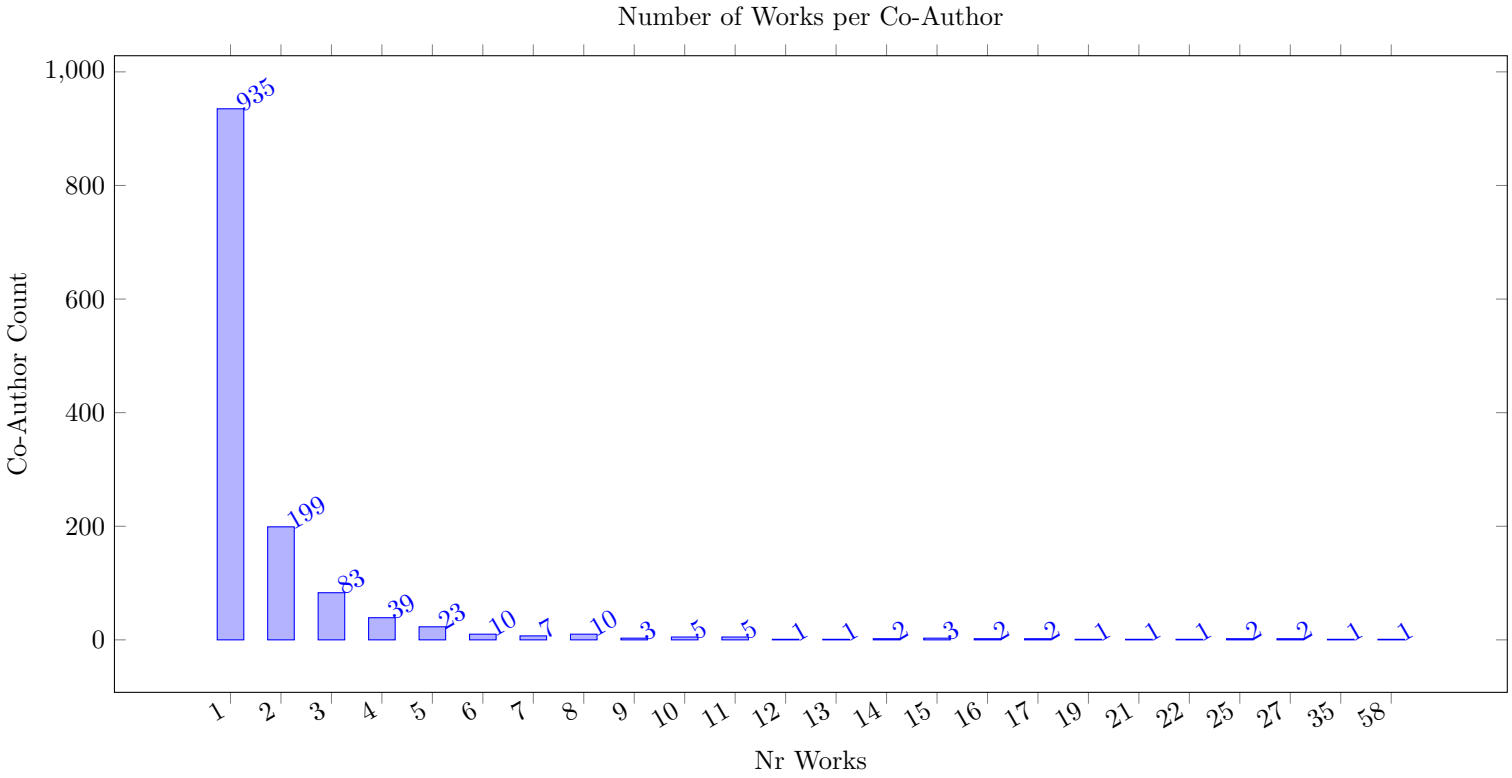

Citations by Year
All
Papers
Articles
Citations
900
800
700
600
500
400
300
200
100
0
1,984
1,986
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
2,026
Year


Citations Per Work by Year
All
Papers
Articles
Avg Citations
300
250
200
150
100
50
0
1,984
1,986
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
2,026
Year

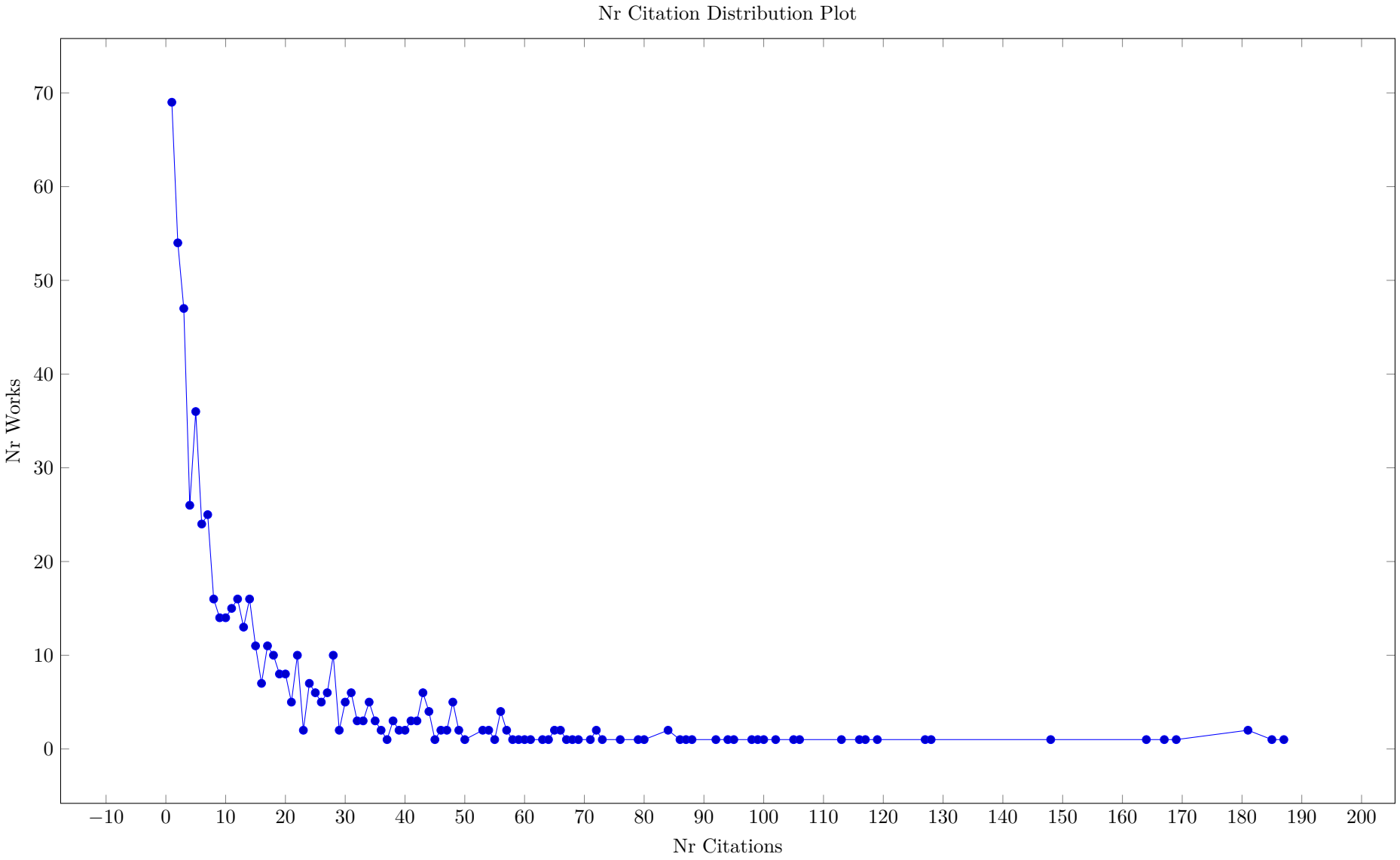
# 8 Number of Coauthors per Work



# 9 Number of Works per Author



# 10 Citation Distribution



# 11 Similarity Measures

The following distribution plot shows the similarity values between two works based on citations and references counts. If either work does not have citation and reference values, then the similarity is set to NaN. The total similarity count is the average of the similarity for citations and for references. As value we compute the ratio of non-shared references (citations) to the sum of individual references (citations). So both the citation and reference similarity range between zero and one, and the average ranges between zero and one. Low values are very rare, as they require both works to be citing the same papers, and being cited by the same papers. A larger value indicates that items are less similar according to this measure. In the plot we group values into 0.1 wide value bins, so an entry for 0.2 includes values from 0.15 to 0.25.

We observe that low values of this similarity are often found for two works by the same authors that are close in time, where we assumes that the bibliographies in both papers is based on the same literature survey. If neither paper is widely cited, the similarity value is low.

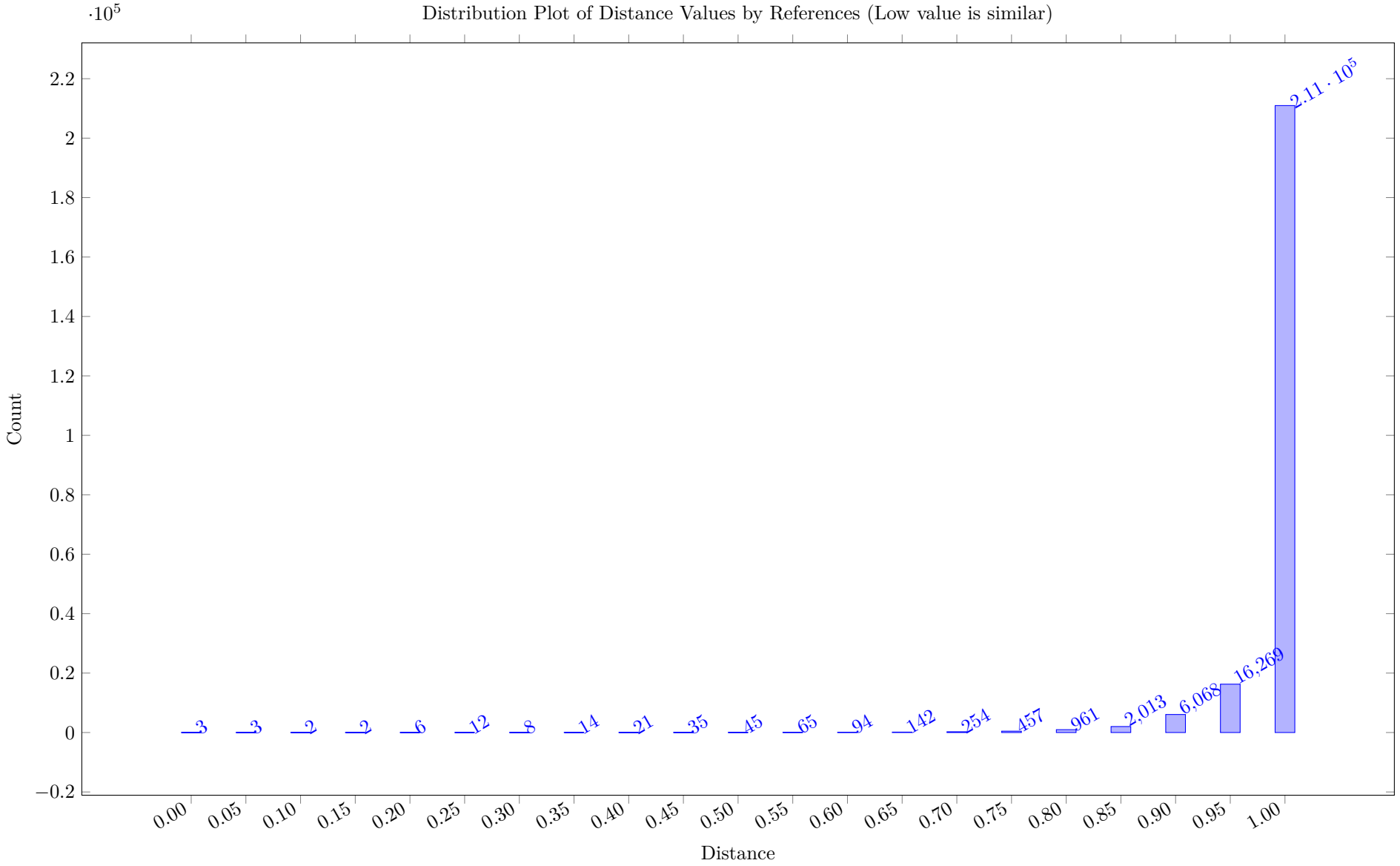
The vast majority of paper pairs has a distance close to one, as their references and citations do not overlap much.

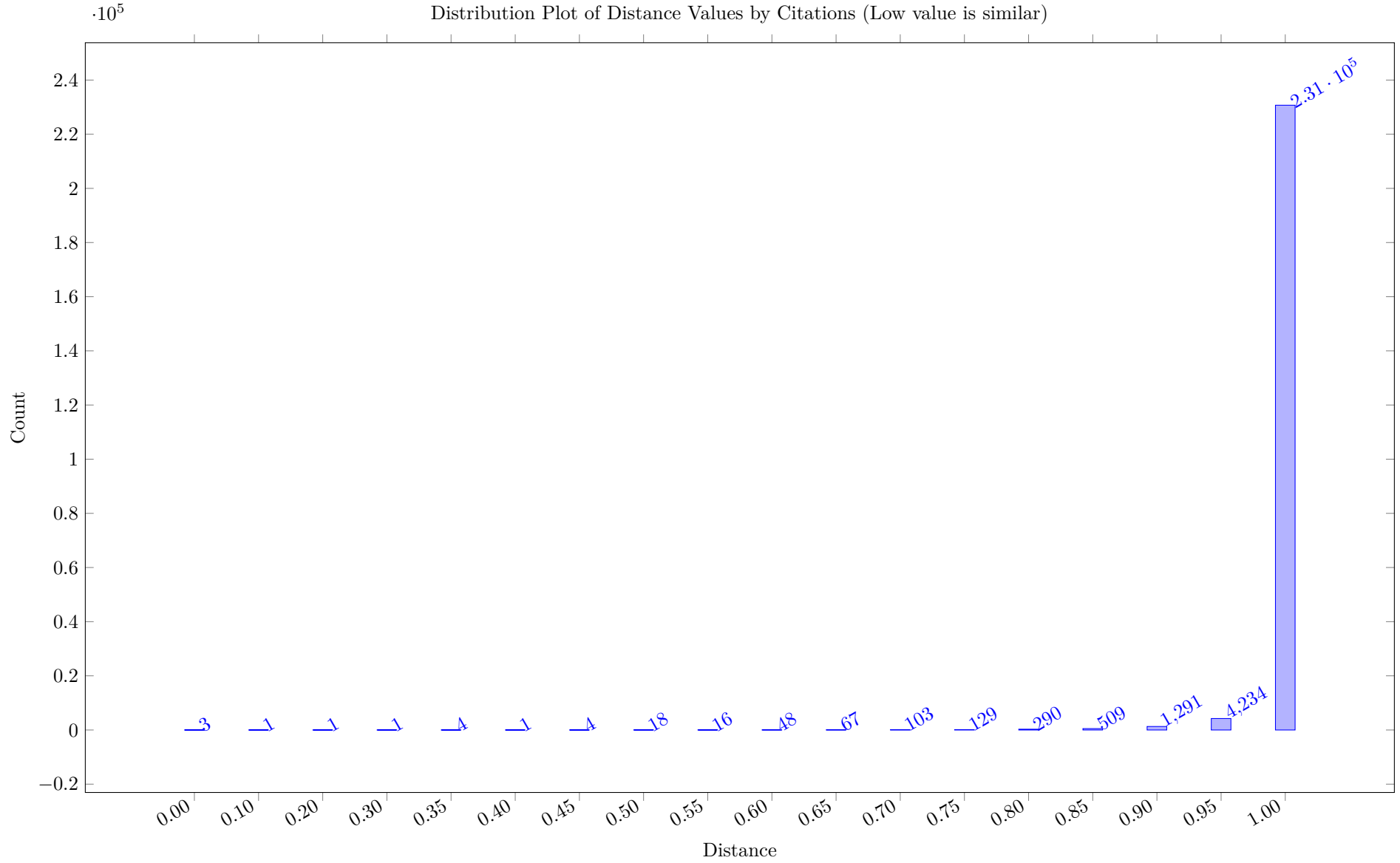
Table 9: Heat Map based on rounded DotProduct Similarity of Concepts (high = similar)

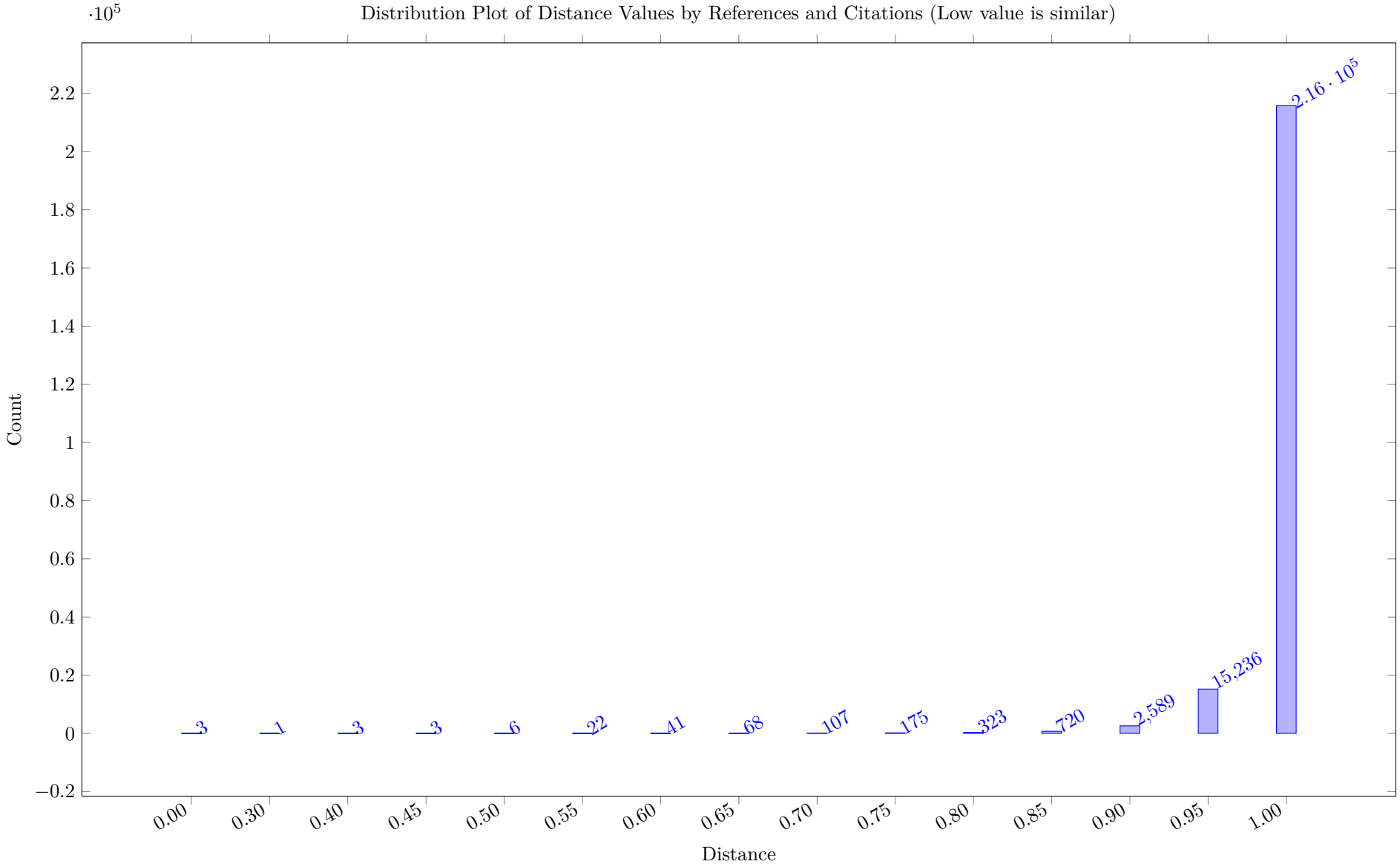
| From/To | Total | ZarandiASC20 | Schutt11 | abs-1902-09244 | YunusogluY22 | ZhuSZW23 | Siala15a | VilimLS15 | abs-2211-14492 | abs-1911-04766 | abs-2402-00459 | ZeballosNH11 | YuraszeckMCCR23 | ZhangBB22 | ZeballosQH10 | YuraszeckMPV22 | abs-2305-19888 | ZeballosH05 | Zahout21 | Wolf05 | TerekhovDOB12 | UnsalO13 | abs-1009-0347 | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | | 86,587 | 65,693 | 64,543 | 64,286 | 62,364 | 62,124 | 62,060 | 61,340 | 59,770 | 58,977 | 58,942 | 57,707 | 57,506 | 56,276 | 55,660 | 55,463 | 55,195 | 55,060 | 54,617 | 54,615 | 54,359 | 54,246 | |
| Baptiste02 | 81,897 | 333 | 262 | 170 | 198 | 163 | 219 | 166 | 161 | 148 | 135 | 166 | 163 | 153 | 149 | 190 | 144 | 137 | 162 | 154 | 201 | 147 | 128 | 78,048 |
| Astrand21 | 80,937 | 311 | 227 | 173 | 199 | 166 | 191 | 161 | 151 | 157 | 142 | 143 | 144 | 151 | 132 | 172 | 149 | 131 | 152 | 129 | 175 | 168 | 122 | 77,291 |
| Beck99 | 73,422 | 243 | 224 | 151 | 161 | 151 | 188 | 149 | 143 | 138 | 137 | 141 | 126 | 129 | 137 | 127 | 123 | 132 | 144 | 141 | 152 | 147 | 131 | 70,107 |
| BartakSR10 | 69,176 | 236 | 202 | 131 | 158 | 146 | 169 | 137 | 142 | 118 | 120 | 135 | 118 | 142 | 129 | 142 | 115 | 126 | 137 | 140 | 159 | 133 | 101 | 66,040 |
| Dejemeppe16 | 68,930 | 339 | 277 | 194 | 216 | 162 | 245 | 168 | 170 | 171 | 163 | 176 | 151 | 157 | 157 | 159 | 144 | 140 | 170 | 156 | 181 | 171 | 138 | 64,925 |
| AwadMDMT22 | 67,123 | 226 | 168 | 153 | 176 | 134 | 135 | 132 | 133 | 129 | 120 | 150 | 130 | 117 | 130 | 132 | 129 | 123 | 128 | 129 | 149 | 130 | 103 | 64,067 |
| BeckDDF98 | 63,584 | 226 | 158 | 144 | 156 | 132 | 158 | 121 | 126 | 111 | 115 | 142 | 110 | 114 | 127 | 113 | 98 | 130 | 115 | 113 | 149 | 123 | 92 | 60,711 |
| AbreuN22 | 63,366 | 229 | 146 | 137 | 167 | 142 | 128 | 124 | 137 | 108 | 124 | 104 | 134 | 116 | 111 | 161 | 133 | 105 | 117 | 101 | 126 | 115 | 83 | 60,518 |
| AfsarVPG23 | 62,553 | 190 | 137 | 138 | 144 | 128 | 125 | 121 | 132 | 118 | 117 | 108 | 121 | 110 | 117 | 133 | 102 | 107 | 111 | 106 | 119 | 123 | 84 | 59,862 |
| AbreuPNF23 | 62,267 | 232 | 152 | 145 | 175 | 133 | 122 | 111 | 124 | 105 | 123 | 110 | 125 | 106 | 107 | 160 | 126 | 105 | 118 | 103 | 138 | 119 | 82 | 59,446 |
| AstrandJZ20 | 61,571 | 182 | 154 | 131 | 131 | 122 | 150 | 128 | 108 | 109 | 102 | 111 | 114 | 122 | 101 | 119 | 105 | 102 | 100 | 104 | 123 | 117 | 100 | 58,936 |
| ArtiguesLH13 | 60,675 | 161 | 144 | 121 | 150 | 94 | 122 | 114 | 108 | 109 | 101 | 130 | 94 | 93 | 113 | 95 | 101 | 118 | 108 | 105 | 128 | 109 | 92 | 58,165 |
| ArmstrongGOS21 | 58,626 | 174 | 145 | 120 | 144 | 134 | 121 | 116 | 118 | 123 | 104 | 96 | 119 | 116 | 110 | 116 | 118 | 104 | 112 | 99 | 104 | 114 | 83 | 56,036 |
| Fahimi16 | 58,087 | 242 | 251 | 149 | 144 | 153 | 217 | 153 | 140 | 138 | 118 | 140 | 131 | 134 | 130 | 133 | 122 | 128 | 129 | 157 | 160 | 156 | 120 | 54,742 |
| Groleaz21 | 57,978 | 371 | 240 | 195 | 224 | 195 | 228 | 189 | 191 | 171 | 179 | 160 | 159 | 178 | 144 | 203 | 162 | 131 | 193 | 136 | 205 | 158 | 132 | 53,834 |
| BartakSR08 | 57,958 | 161 | 161 | 106 | 120 | 119 | 145 | 118 | 112 | 95 | 102 | 102 | 102 | 116 | 95 | 115 | 89 | 100 | 97 | 108 | 121 | 106 | 85 | 55,483 |
| ColT22 | 57,662 | 251 | 163 | 152 | 178 | 156 | 161 | 141 | 147 | 153 | 138 | 139 | 142 | 132 | 126 | 157 | 136 | 122 | 135 | 113 | 133 | 138 | 95 | 54,454 |
| BeckF98 | 57,614 | 186 | 152 | 121 | 128 | 128 | 151 | 122 | 115 | 108 | 114 | 109 | 106 | 105 | 103 | 102 | 97 | 105 | 118 | 114 | 122 | 115 | 99 | 54,994 |
| ArkhipovBL19 | 57,490 | 143 | 169 | 109 | 110 | 101 | 124 | 138 | 98 | 103 | 93 | 92 | 114 | 107 | 93 | 85 | 95 | 84 | 103 | 109 | 109 | 102 | 116 | 55,093 |
| AbreuNP23 | 57,342 | 203 | 131 | 131 | 157 | 137 | 119 | 116 | 124 | 94 | 107 | 102 | 126 | 112 | 100 | 150 | 125 | 92 | 102 | 90 | 121 | 103 | 70 | 54,730 |
| BlazewiczDP96 | 56,643 | 238 | 177 | 129 | 144 | 131 | 146 | 121 | 129 | 103 | 117 | 112 | 101 | 134 | 107 | 129 | 103 | 100 | 120 | 118 | 147 | 114 | 102 | 53,821 |
| Caballero19 | 56,516 | 175 | 239 | 128 | 122 | 117 | 202 | 158 | 106 | 121 | 93 | 110 | 126 | 118 | 112 | 84 | 109 | 99 | 122 | 111 | 119 | 126 | 160 | 53,659 |
| BajestaniB13 | 56,496 | 185 | 119 | 114 | 127 | 118 | 110 | 109 | 102 | 89 | 100 | 114 | 86 | 94 | 89 | 98 | 86 | 87 | 108 | 90 | 131 | 96 | 79 | 54,165 |
| AbreuAPNM21 | 55,865 | 208 | 128 | 121 | 147 | 127 | 114 | 103 | 119 | 90 | 113 | 89 | 121 | 107 | 96 | 152 | 111 | 86 | 110 | 89 | 124 | 93 | 68 | 53,349 |
| BaptisteP00 | 55,199 | 139 | 165 | 105 | 101 | 97 | 142 | 122 | 91 | 102 | 82 | 102 | 103 | 101 | 94 | 83 | 83 | 87 | 106 | 111 | 112 | 112 | 107 | 52,852 |
| AlfieriGPS23 | 54,996 | 190 | 118 | 132 | 141 | 116 | 107 | 99 | 116 | 82 | 114 | 102 | 110 | 109 | 90 | 130 | 94 | 97 | 97 | 91 | 128 | 94 | 73 | 52,566 |
| BeckF00 | 54,941 | 156 | 168 | 109 | 106 | 115 | 160 | 117 | 102 | 96 | 87 | 108 | 94 | 106 | 95 | 93 | 79 | 99 | 87 | 110 | 115 | 109 | 98 | 52,532 |
| Godet21a | 54,753 | 259 | 257 | 152 | 163 | 148 | 242 | 171 | 157 | 159 | 130 | 126 | 158 | 146 | 130 | 144 | 130 | 124 | 158 | 136 | 164 | 154 | 151 | 51,194 |
| BaptisteP97 | 54,638 | 144 | 165 | 111 | 98 | 94 | 136 | 123 | 88 | 104 | 84 | 101 | 104 | 98 | 88 | 83 | 80 | 85 | 104 | 110 | 112 | 111 | 109 | 52,306 |
| BaptistePN99 | 54,237 | 153 | 161 | 113 | 108 | 93 | 127 | 123 | 95 | 103 | 89 | 90 | 111 | 97 | 88 | 98 | 85 | 81 | 106 | 113 | 121 | 97 | 99 | 51,886 |
| BidotVLB09 | 53,682 | 190 | 134 | 132 | 137 | 106 | 128 | 116 | 105 | 102 | 101 | 120 | 113 | 102 | 114 | 112 | 90 | 115 | 95 | 103 | 131 | 97 | 93 | 51,146 |
| BeckPS03 | 53,059 | 157 | 138 | 126 | 124 | 108 | 131 | 116 | 110 | 97 | 98 | 115 | 111 | 101 | 107 | 100 | 92 | 113 | 91 | 107 | 118 | 102 | 92 | 50,605 |
| BeckW07 | 53,037 | 171 | 141 | 124 | 108 | 103 | 128 | 123 | 103 | 93 | 94 | 98 | 117 | 103 | 97 | 104 | 87 | 101 | 108 | 107 | 121 | 91 | 104 | 50,611 |
| BonninMNE24 | 52,812 | 172 | 159 | 113 | 122 | 112 | 131 | 119 | 104 | 110 | 99 | 98 | 106 | 113 | 99 | 131 | 101 | 99 | 109 | 123 | 128 | 119 | 99 | 50,246 |
| ArtiguesF07 | 52,415 | 149 | 146 | 100 | 127 | 120 | 132 | 117 | 108 | 70 | 91 | 95 | 100 | 129 | 92 | 111 | 98 | 88 | 85 | 99 | 109 | 87 | 84 | 50,078 |
| BonfiettiLBM14 | 52,123 | 138 | 159 | 109 | 104 | 107 | 145 | 134 | 96 | 102 | 95 | 105 | 105 | 104 | 94 | 81 | 88 | 94 | 99 | 103 | 103 | 107 | 116 | 49,735 |
| Adelgren2023 | 51,743 | 139 | 105 | 86 | 106 | 98 | 93 | 93 | 91 | 84 | 80 | 87 | 85 | 92 | 80 | 100 | 99 | 79 | 92 | 90 | 92 | 95 | 66 | 49,711 |
| BosiM2001 | 51,384 | 156 | 156 | 107 | 128 | 105 | 152 | 128 | 115 | 100 | 105 | 105 | 112 | 120 | 105 | 103 | 98 | 95 | 101 | 100 | 123 | 93 | 101 | 48,876 |
| Astrand0F21 | 51,254 | 123 | 117 | 96 | 97 | 98 | 120 | 106 | 91 | 97 | 94 | 81 | 98 | 103 | 88 | 93 | 86 | 90 | 83 | 86 | 93 | 95 | 81 | 49,138 |
| AntuoriHHEN20 | 51,068 | 134 | 118 | 103 | 99 | 80 | 110 | 92 | 109 | 86 | 99 | 91 | 78 | 88 | 82 | 82 | 68 | 87 | 77 | 79 | 97 | 81 | 80 | 49,048 |
| Bit-Monnot23 | 50,648 | 136 | 152 | 105 | 98 | 118 | 174 | 127 | 105 | 103 | 98 | 92 | 105 | 119 | 86 | 104 | 86 | 91 | 96 | 99 | 101 | 99 | 107 | 48,247 |
| ChenGPSH10 | 50,431 | 168 | 158 | 98 | 106 | 118 | 146 | 121 | 110 | 96 | 96 | 115 | 97 | 110 | 102 | 103 | 82 | 103 | 96 | 114 | 115 | 114 | 95 | 47,968 |
| Other | | 78,268 | 58,650 | 59,159 | 58,437 | 57,139 | 55,830 | 56,697 | 56,308 | 55,075 | 54,364 | 54,130 | 52,837 | 52,602 | 51,730 | 50,578 | 51,015 | 50,773 | 50,259 | 49,921 | 49,136 | 49,479 | 50,026 | |

Table 10: Heat Map based on 100*Cosine Similarity of Concepts (high = similar)

| From/To | Total | ZeballosH05 | abs-2312-13682 | ZeballosM09 | VilimLS15 | abs-1901-07914 | ZhangYW21 | Wolf05 | ZeballosQH10 | ZouZ20 | abs-2305-19888 | abs-1902-09244 | VilimBC05 | abs-2306-05747 | WikarekS19 | VilimBC04 | ZeballosNH11 | abs-1009-0347 | WatsonB08 | ZhangBB22 | abs-2211-14492 | ZibranR11a | WolfS05 | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | | 42,068 | 41,798 | 41,762 | 41,175 | 40,857 | 40,668 | 40,578 | 40,323 | 39,986 | 39,885 | 39,820 | 39,816 | 39,751 | 39,749 | 39,721 | 39,692 | 39,474 | 39,425 | 39,392 | 39,382 | 39,380 | 39,069 | |
| ArkhipovBL19 | 41,330 | 57 | 55 | 57 | 81 | 56 | 67 | 72 | 59 | 51 | 61 | 60 | 65 | 58 | 72 | 63 | 55 | 75 | 62 | 66 | 56 | 46 | 65 | 39,971 |
| BartakSR08 | 41,324 | 67 | 57 | 59 | 69 | 60 | 63 | 70 | 60 | 57 | 57 | 58 | 76 | 60 | 72 | 76 | 60 | 54 | 66 | 71 | 64 | 51 | 57 | 39,940 |
| BeckPS03 | 41,139 | 82 | 62 | 75 | 73 | 67 | 71 | 75 | 73 | 57 | 63 | 75 | 73 | 67 | 72 | 73 | 74 | 64 | 75 | 66 | 68 | 54 | 54 | 39,626 |
| Bartak02a | 40,896 | 67 | 61 | 61 | 71 | 64 | 62 | 66 | 62 | 59 | 53 | 57 | 70 | 58 | 68 | 71 | 60 | 64 | 63 | 60 | 60 | 49 | 60 | 39,530 |
| AfsarVPG23 | 40,519 | 65 | 54 | 63 | 65 | 53 | 74 | 63 | 68 | 59 | 59 | 69 | 59 | 67 | 56 | 62 | 59 | 49 | 69 | 61 | 69 | 50 | 46 | 39,180 |
| AstrandJZ18 | 40,460 | 67 | 70 | 68 | 64 | 71 | 54 | 62 | 65 | 58 | 56 | 52 | 61 | 53 | 57 | 59 | 55 | 65 | 58 | 54 | 51 | 67 | 63 | 39,130 |
| AstrandJZ20 | 40,416 | 63 | 61 | 62 | 69 | 56 | 67 | 63 | 59 | 53 | 62 | 66 | 69 | 64 | 65 | 68 | 61 | 59 | 68 | 68 | 57 | 52 | 44 | 39,060 |
| ArtiguesLH13 | 39,560 | 72 | 58 | 68 | 61 | 52 | 49 | 63 | 65 | 56 | 59 | 61 | 60 | 49 | 54 | 60 | 70 | 54 | 52 | 52 | 56 | 58 | 61 | 38,270 |
| Beck07 | 39,374 | 65 | 58 | 65 | 73 | 57 | 73 | 69 | 60 | 55 | 54 | 65 | 69 | 70 | 65 | 75 | 60 | 62 | 86 | 72 | 68 | 61 | 44 | 37,948 |
| Astrand0F21 | 39,321 | 64 | 64 | 57 | 66 | 65 | 68 | 60 | 59 | 48 | 59 | 56 | 64 | 63 | 65 | 62 | 51 | 55 | 64 | 67 | 55 | 46 | 50 | 38,013 |
| AalianPG23 | 39,260 | 59 | 73 | 62 | 61 | 59 | 54 | 57 | 59 | 55 | 61 | 58 | 58 | 56 | 52 | 59 | 49 | 63 | 55 | 52 | 44 | 61 | 63 | 37,990 |
| Adelgren2023 | 39,254 | 56 | 60 | 55 | 58 | 58 | 60 | 62 | 54 | 49 | 67 | 50 | 53 | 56 | 57 | 52 | 55 | 45 | 59 | 59 | 55 | 47 | 54 | 38,033 |
| AbidinK20 | 39,074 | 55 | 56 | 55 | 53 | 50 | 58 | 47 | 60 | 70 | 51 | 56 | 53 | 46 | 51 | 47 | 57 | 52 | 51 | 51 | 49 | 64 | 61 | 37,881 |
| AngelsmarkJ00 | 39,059 | 55 | 50 | 63 | 56 | 60 | 49 | 61 | 50 | 49 | 45 | 39 | 54 | 48 | 57 | 53 | 53 | 43 | 56 | 50 | 53 | 52 | 63 | 37,900 |
| BaptisteP97 | 38,629 | 56 | 54 | 59 | 71 | 49 | 64 | 71 | 55 | 54 | 50 | 60 | 71 | 55 | 64 | 73 | 59 | 69 | 57 | 59 | 50 | 53 | 59 | 37,317 |
| Alaka21 | 38,453 | 60 | 56 | 53 | 53 | 57 | 63 | 53 | 60 | 68 | 55 | 53 | 56 | 48 | 53 | 49 | 47 | 55 | 48 | 53 | 49 | 53 | 58 | 37,253 |
| AwadMDMT22 | 38,295 | 66 | 53 | 61 | 62 | 47 | 65 | 68 | 66 | 57 | 66 | 68 | 61 | 58 | 58 | 58 | 72 | 53 | 58 | 58 | 61 | 51 | 54 | 36,974 |
| ArtiguesBF04 | 38,240 | 58 | 51 | 53 | 69 | 49 | 69 | 67 | 60 | 41 | 63 | 54 | 71 | 62 | 73 | 69 | 59 | 55 | 76 | 79 | 61 | 43 | 38 | 36,920 |
| BeckDDF98 | 38,211 | 73 | 58 | 71 | 60 | 62 | 63 | 62 | 68 | 56 | 53 | 67 | 65 | 58 | 67 | 66 | 71 | 50 | 61 | 58 | 60 | 55 | 49 | 36,858 |
| AkramNHRSA23 | 38,174 | 56 | 57 | 54 | 56 | 63 | 62 | 59 | 55 | 56 | 59 | 47 | 49 | 58 | 46 | 48 | 43 | 51 | 59 | 50 | 63 | 58 | 61 | 36,964 |
| Beck06 | 38,089 | 67 | 62 | 64 | 65 | 62 | 66 | 67 | 59 | 43 | 53 | 63 | 63 | 69 | 68 | 67 | 61 | 52 | 86 | 68 | 69 | 52 | 44 | 36,719 |
| BeckFW11 | 38,006 | 62 | 63 | 61 | 74 | 60 | 72 | 70 | 63 | 46 | 62 | 62 | 65 | 78 | 70 | 71 | 54 | 60 | 93 | 74 | 72 | 52 | 49 | 36,573 |
| Bartak02 | 37,778 | 59 | 53 | 67 | 61 | 59 | 47 | 61 | 53 | 57 | 44 | 45 | 64 | 45 | 68 | 63 | 61 | 52 | 51 | 50 | 49 | 56 | 61 | 36,552 |
| BeckF98 | 37,744 | 64 | 49 | 57 | 65 | 63 | 70 | 68 | 60 | 55 | 57 | 61 | 67 | 60 | 66 | 69 | 59 | 58 | 63 | 59 | 60 | 46 | 49 | 36,419 |
| ArtiguesF07 | 37,677 | 60 | 49 | 52 | 70 | 48 | 71 | 66 | 59 | 43 | 64 | 56 | 72 | 60 | 70 | 70 | 58 | 55 | 72 | 80 | 63 | 39 | 37 | 36,363 |
| BartakSR10 | 37,645 | 65 | 48 | 58 | 62 | 60 | 61 | 70 | 63 | 51 | 56 | 55 | 70 | 55 | 71 | 68 | 62 | 50 | 58 | 66 | 62 | 43 | 55 | 36,336 |
| BaptisteB18 | 37,636 | 55 | 61 | 58 | 67 | 61 | 55 | 70 | 54 | 47 | 58 | 49 | 62 | 51 | 63 | 62 | 54 | 68 | 54 | 52 | 47 | 47 | 66 | 36,375 |
| BeckF00a | 37,628 | 64 | 52 | 66 | 64 | 59 | 56 | 70 | 57 | 57 | 48 | 50 | 79 | 53 | 64 | 78 | 62 | 55 | 64 | 56 | 53 | 55 | 55 | 36,311 |
| BaptisteP00 | 37,623 | 56 | 52 | 58 | 68 | 47 | 61 | 69 | 57 | 52 | 51 | 55 | 68 | 53 | 64 | 71 | 58 | 65 | 58 | 59 | 50 | 51 | 58 | 36,342 |
| BeckW07 | 37,549 | 67 | 55 | 60 | 71 | 61 | 70 | 69 | 60 | 58 | 55 | 67 | 69 | 60 | 68 | 71 | 57 | 66 | 66 | 62 | 58 | 52 | 49 | 36,178 |
| BaptistePN99 | 37,546 | 53 | 51 | 52 | 70 | 45 | 66 | 72 | 54 | 44 | 53 | 60 | 67 | 55 | 67 | 69 | 52 | 62 | 58 | 57 | 53 | 45 | 55 | 36,286 |
| BockmayrP06 | 37,389 | 65 | 73 | 69 | 64 | 69 | 49 | 62 | 64 | 55 | 60 | 55 | 60 | 55 | 60 | 57 | 57 | 61 | 58 | 53 | 55 | 61 | 78 | 36,049 |
| AlakaP23 | 37,363 | 55 | 52 | 51 | 51 | 60 | 63 | 46 | 58 | 66 | 51 | 50 | 52 | 44 | 54 | 46 | 48 | 52 | 45 | 50 | 45 | 51 | 54 | 36,219 |
| Astrand21 | 37,262 | 57 | 52 | 54 | 62 | 49 | 61 | 55 | 55 | 52 | 62 | 62 | 61 | 57 | 57 | 59 | 55 | 51 | 56 | 60 | 56 | 47 | 41 | 36,041 |
| BeckDSF97a | 37,204 | 63 | 51 | 67 | 65 | 61 | 64 | 69 | 58 | 50 | 48 | 58 | 73 | 59 | 62 | 79 | 60 | 56 | 72 | 61 | 59 | 55 | 44 | 35,870 |
| BeckDSF97 | 37,162 | 59 | 53 | 62 | 64 | 55 | 60 | 65 | 55 | 53 | 47 | 56 | 75 | 55 | 64 | 79 | 61 | 55 | 60 | 56 | 55 | 52 | 54 | 35,867 |
| AlesioBNG15 | 37,081 | 53 | 51 | 55 | 54 | 56 | 60 | 59 | 57 | 65 | 56 | 47 | 49 | 52 | 49 | 49 | 53 | 46 | 54 | 50 | 53 | 64 | 61 | 35,888 |
| Beck99 | 36,971 | 63 | 52 | 60 | 62 | 56 | 65 | 65 | 61 | 56 | 56 | 59 | 68 | 57 | 61 | 69 | 59 | 59 | 63 | 56 | 58 | 49 | 52 | 35,665 |
| AlakaPY19 | 36,924 | 58 | 50 | 51 | 51 | 54 | 59 | 49 | 57 | 68 | 52 | 51 | 53 | 43 | 49 | 45 | 47 | 52 | 41 | 49 | 46 | 50 | 59 | 35,790 |
| BaptisteP95 | 36,907 | 57 | 43 | 62 | 58 | 48 | 53 | 75 | 56 | 49 | 45 | 43 | 65 | 48 | 60 | 66 | 59 | 48 | 55 | 57 | 54 | 51 | 58 | 35,697 |
| BeniniLMR11 | 36,846 | 66 | 62 | 65 | 67 | 61 | 56 | 63 | 64 | 65 | 58 | 57 | 61 | 53 | 58 | 61 | 65 | 73 | 56 | 56 | 52 | 59 | 59 | 35,509 |
| AbreuN22 | 36,782 | 58 | 56 | 48 | 60 | 49 | 66 | 54 | 58 | 49 | 70 | 62 | 52 | 63 | 57 | 53 | 51 | 44 | 62 | 58 | 64 | 42 | 48 | 35,558 |
| Other | | 39,479 | 39,440 | 39,244 | 38,489 | 38,459 | 38,062 | 37,894 | 37,824 | 37,697 | 37,526 | 37,426 | 37,144 | 37,372 | 37,155 | 37,056 | 37,269 | 37,097 | 36,837 | 36,897 | 37,000 | 37,190 | 36,779 | |

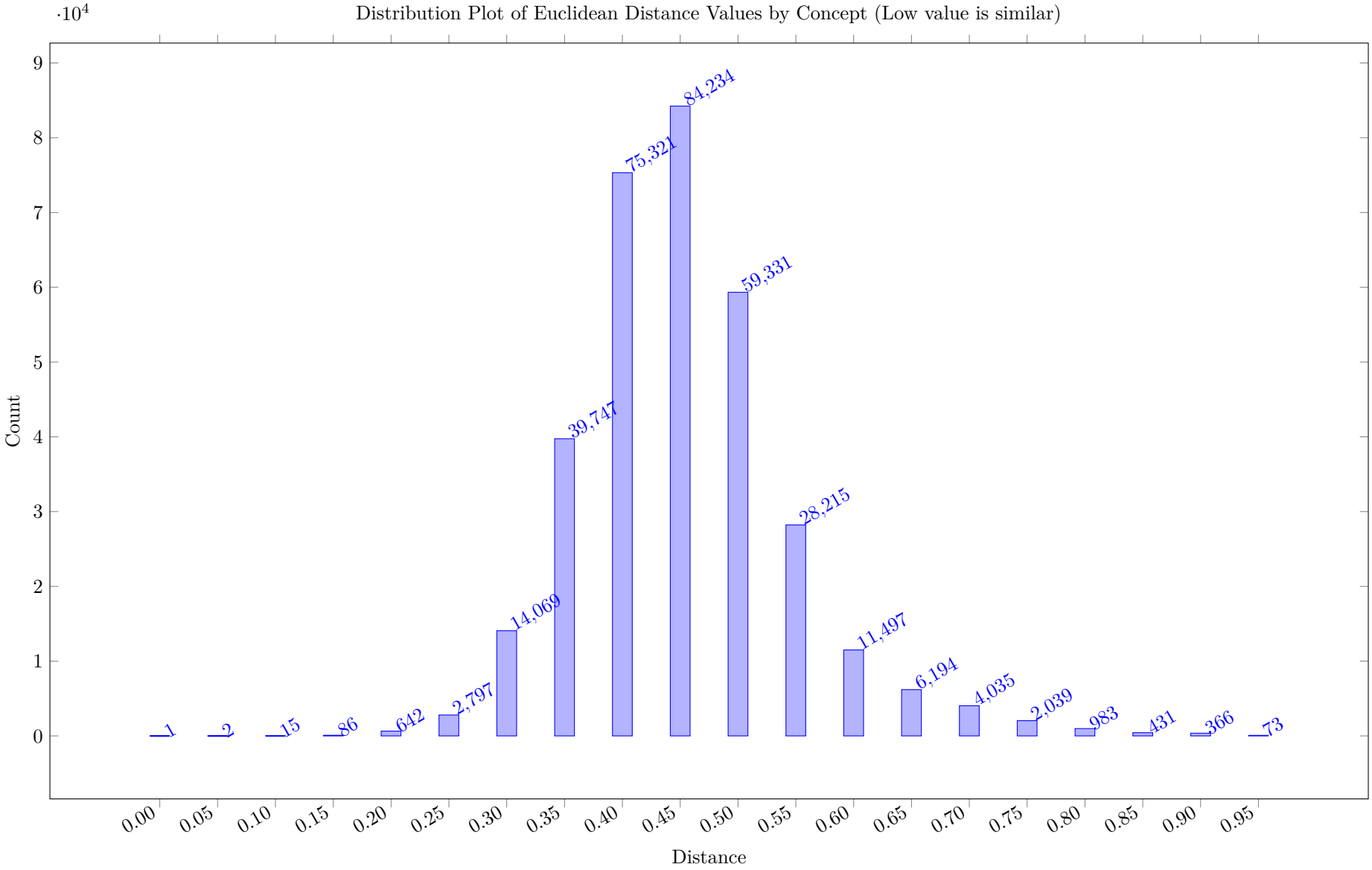

Distribution Plot of Distance Values by References (Low value is similar)
$\cdot 10^5$
Count
Distance
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
−0.2
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
0.55
0.60
0.65
0.70
0.75
0.80
0.85
0.90
0.95
1.00
3
3
2
2
6
12
8
14
21
35
45
65
94
142
254
457
961
2,013
6,068
16,269
$2.11 \cdot 10^5$

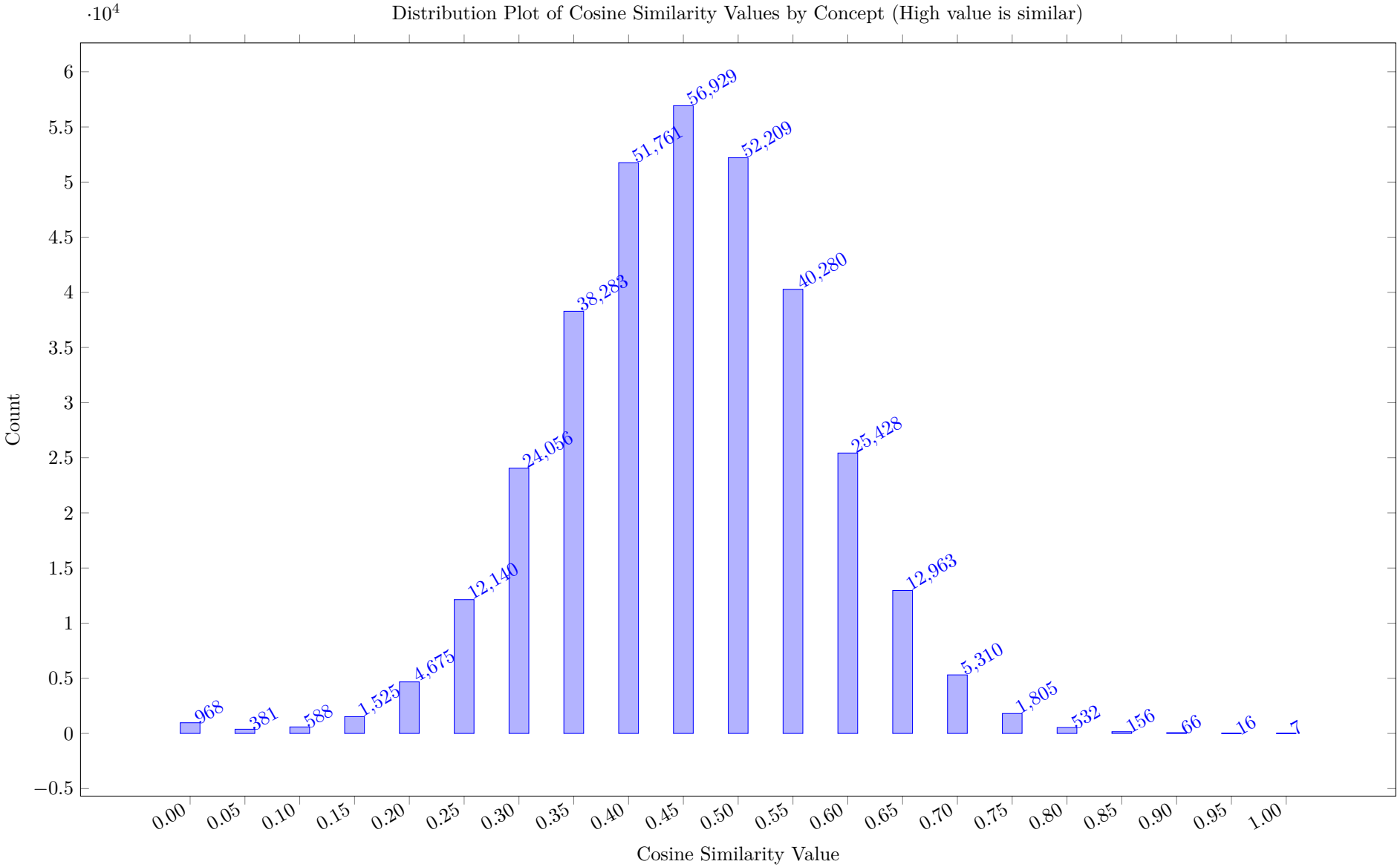

Distribution Plot of Distance Values by Citations (Low value is similar)
$\cdot 10^5$
Count
Distance
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
−0.2
0.00
0.10
0.20
0.30
0.35
0.40
0.45
0.50
0.55
0.60
0.65
0.70
0.75
0.80
0.85
0.90
0.95
1.00
3
1
1
1
4
1
4
18
16
48
67
103
129
290
509
1,291
4,234
$2.31 \cdot 10^5$

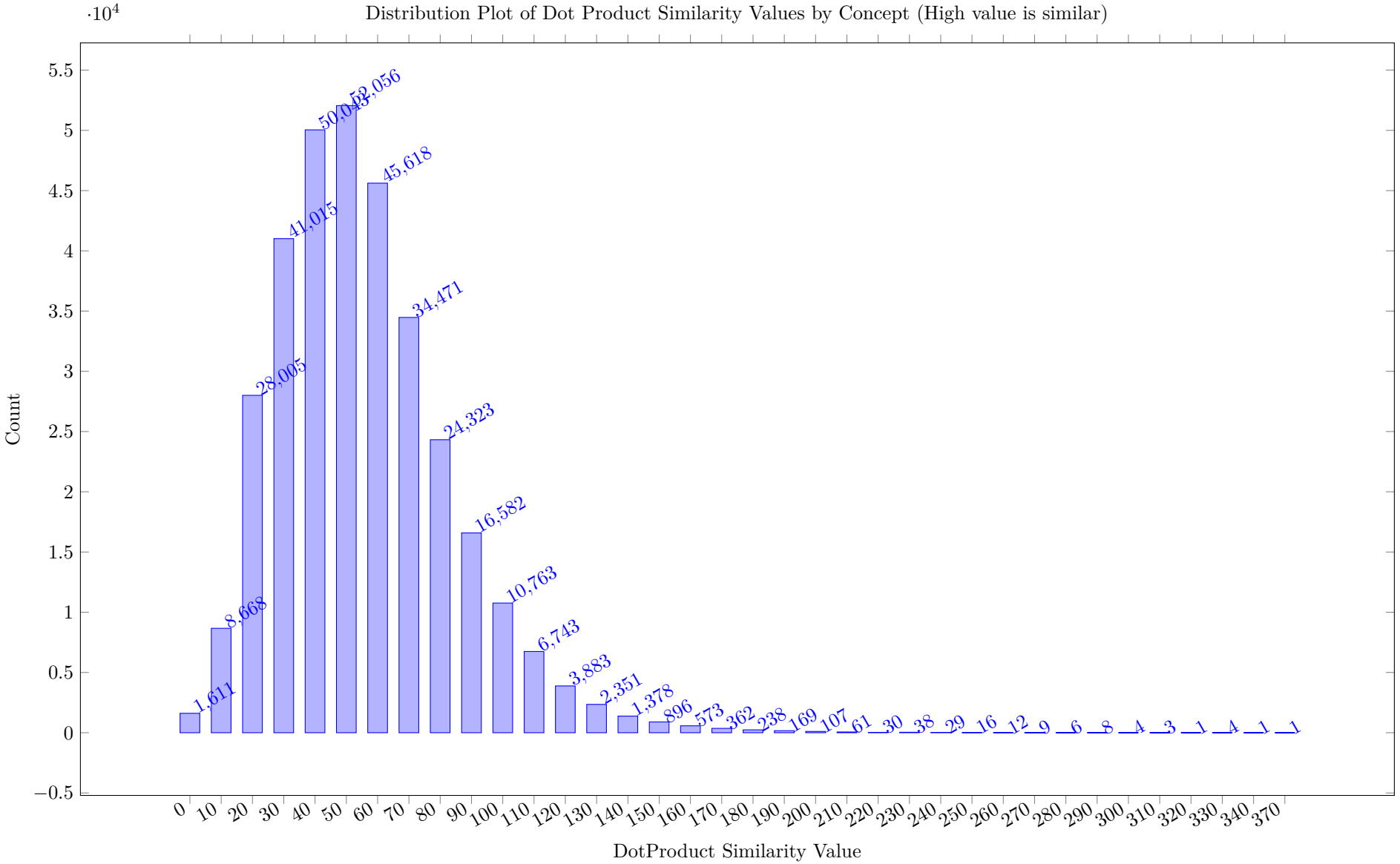



The similarity by concept uses the Euclidean distance between the feature vectors for two works. We translate the MatchLevel for each Concept into a linear

scale, and then calculate the distances as the square root of the sum of squared differences for each feature. The distribution plot below rounds the distances to integer values. Similarity values of this type are only calculated when both works have a local copy, from which we extract the features. If either work does not have a local copy, the similarity is set to be NaN.


Distribution Plot of Euclidean Distance Values by Concept (Low value is similar)
$\cdot 10^4$
Count
Distance
0 1 2 3 4 5 6 7 8 9
0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95
1
2
15
86
642
2,797
14,069
39,747
75,321
84,234
59,331
28,215
11,497
6,194
4,035
2,039
983
431
366
73

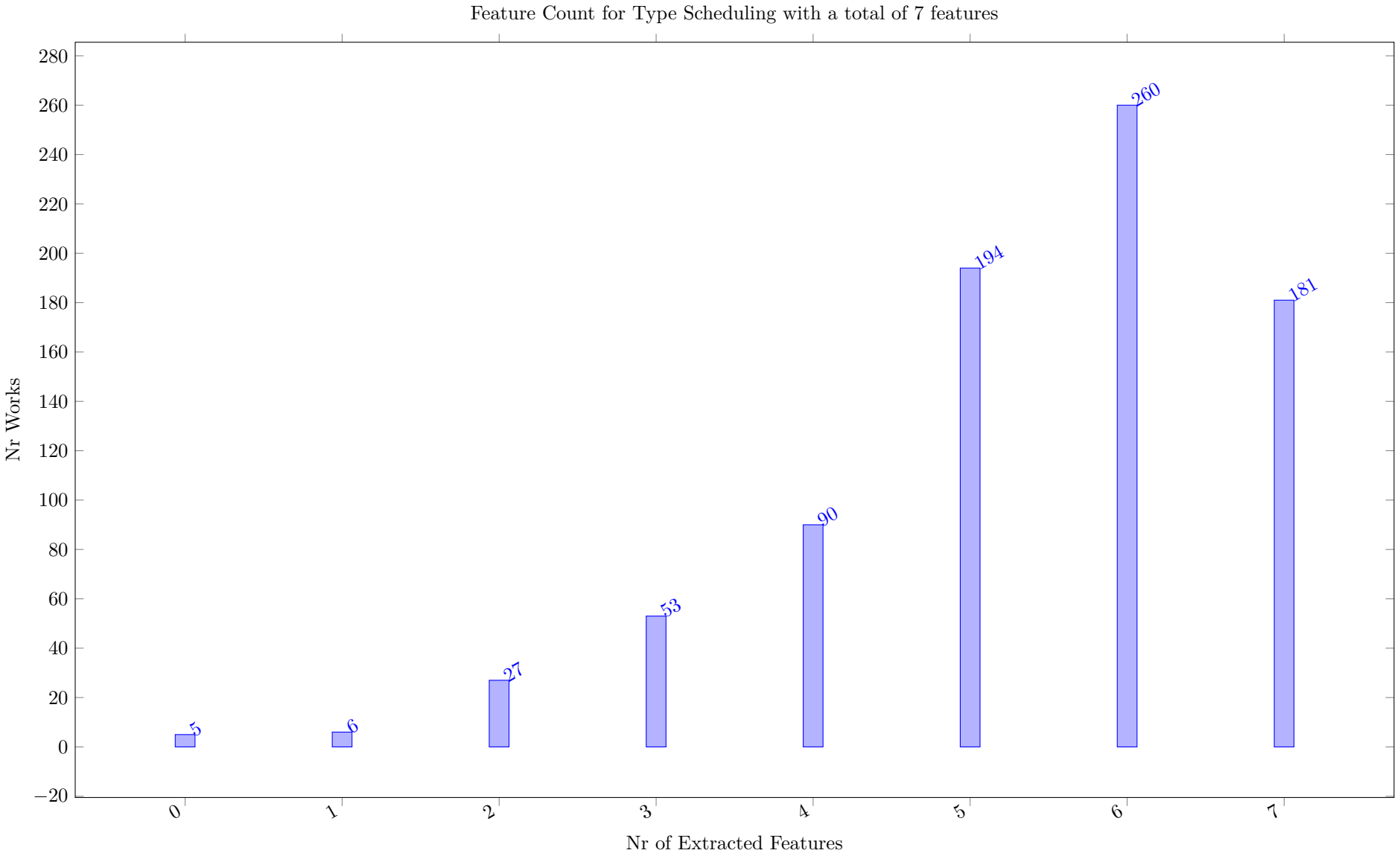

Distribution Plot of Cosine Similarity Values by Concept (High value is similar)
$\cdot 10^4$
Count
Cosine Similarity Value
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.5
968
381
588
1,525
4,675
12,140
24,056
38,283
51,761
56,929
52,209
40,280
25,428
12,963
5,310
1,805
532
156
66
16
7
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
0.55
0.60
0.65
0.70
0.75
0.80
0.85
0.90
0.95
1.00

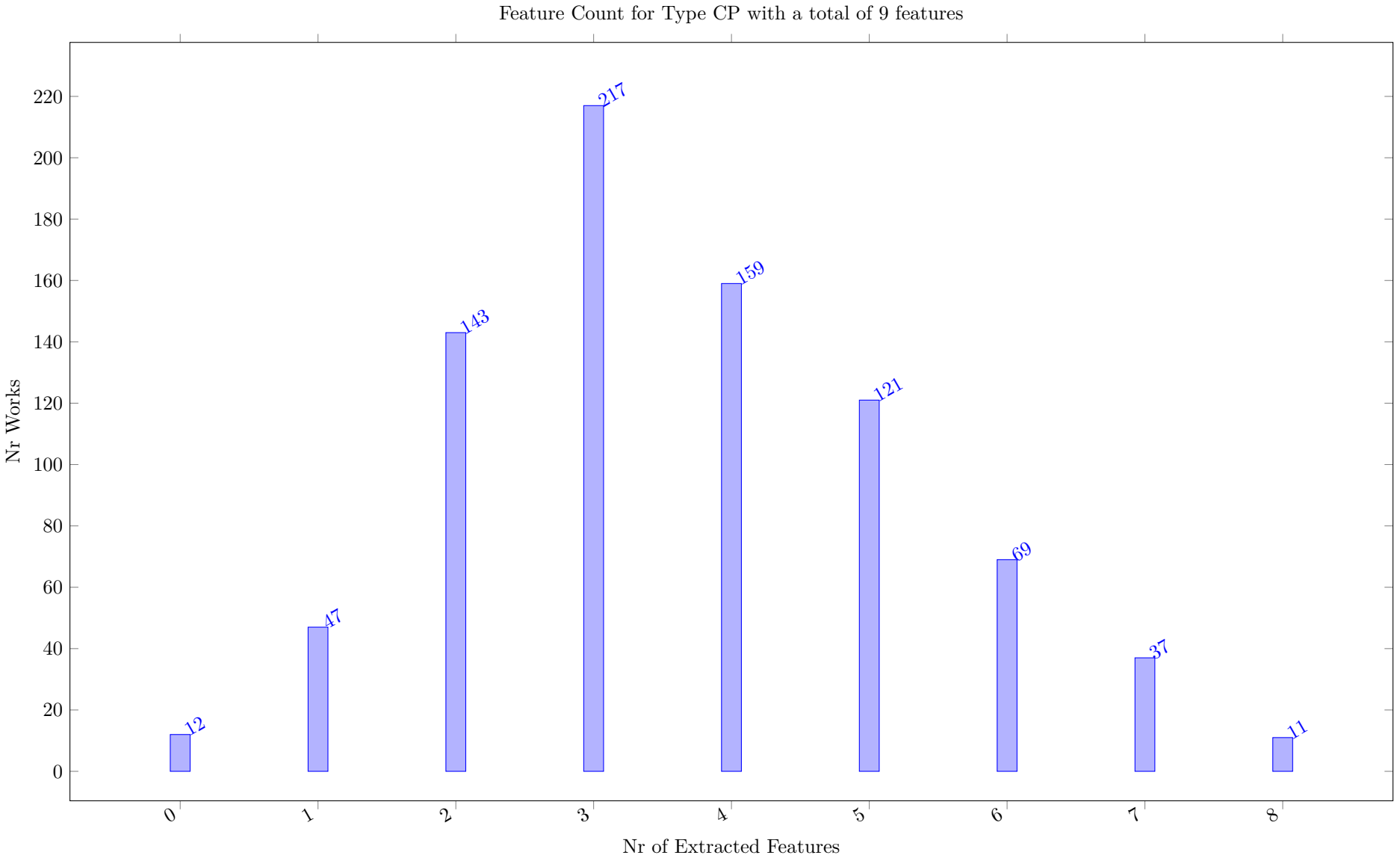

Distribution Plot of Dot Product Similarity Values by Concept (High value is similar)
$\cdot 10^4$
Count
DotProduct Similarity Value
1,611
8,668
28,005
41,015
50,043
52,056
45,618
34,471
24,323
16,582
10,763
6,743
3,883
2,351
1,378
896
573
362
238
169
107
61
30
38
29
16
12
9
6
8
4
3
1
4
1
1

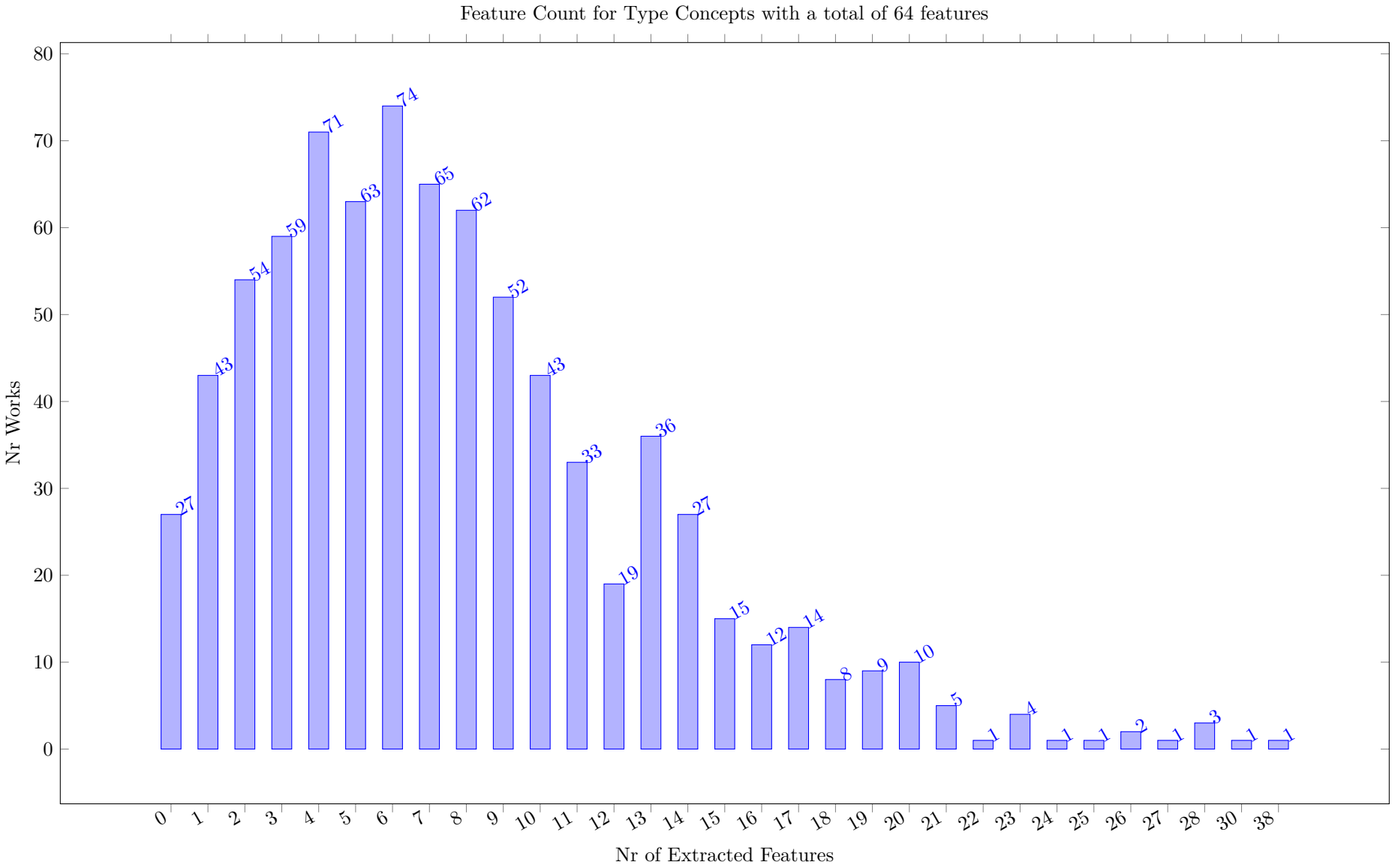
# 12 Concept Distribution

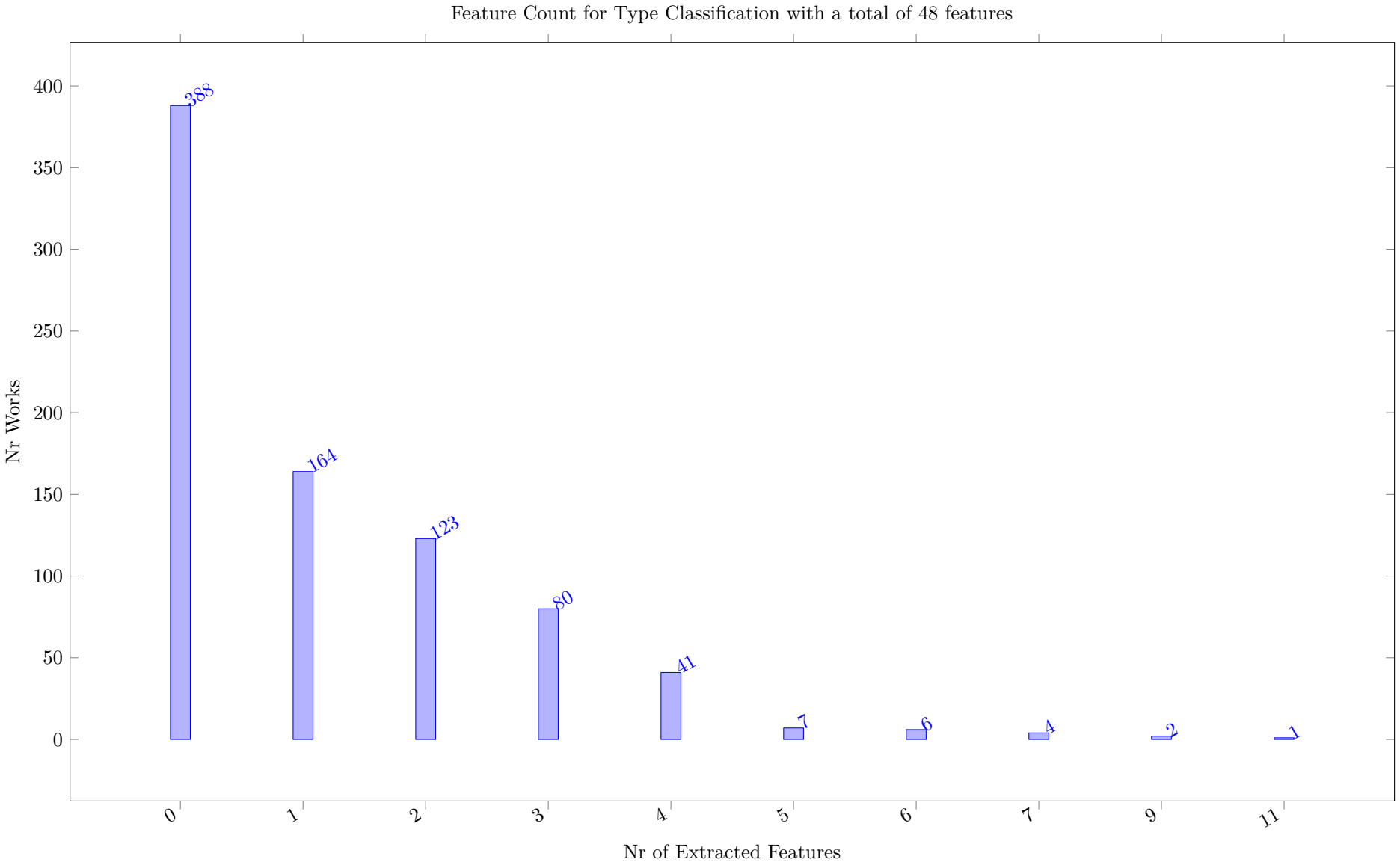
For each concept type, we count how many features are extracted by the individual works that do have a local copy, e.g. for which we can extract features. We can compare the number of features extracted to the number of concepts of a given type, which is stated in the title of the diagram.

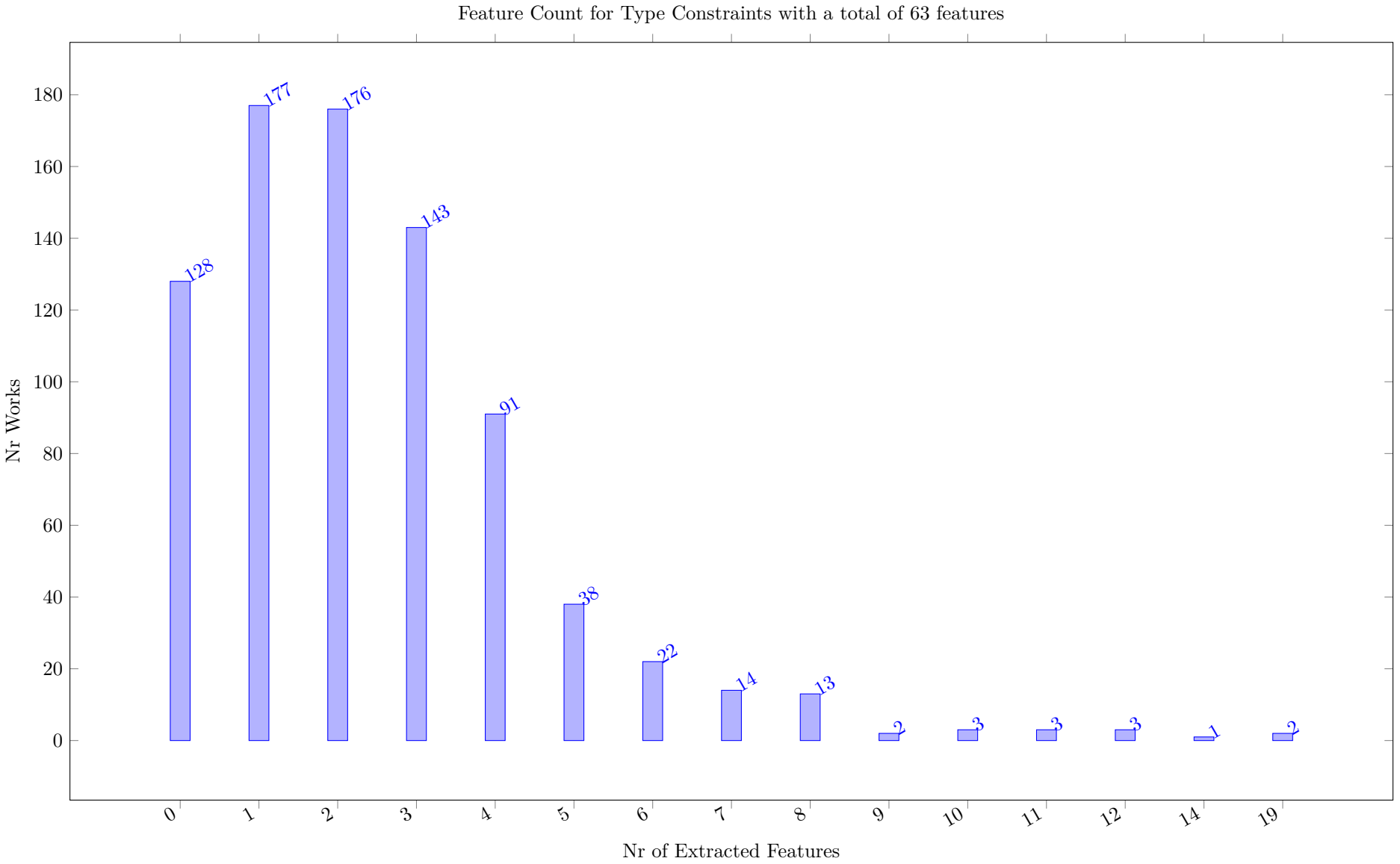
A high count indicates that a work covers many of the concepts of the given type, a low count might mean that our ontology does not have relevant concepts for that work.

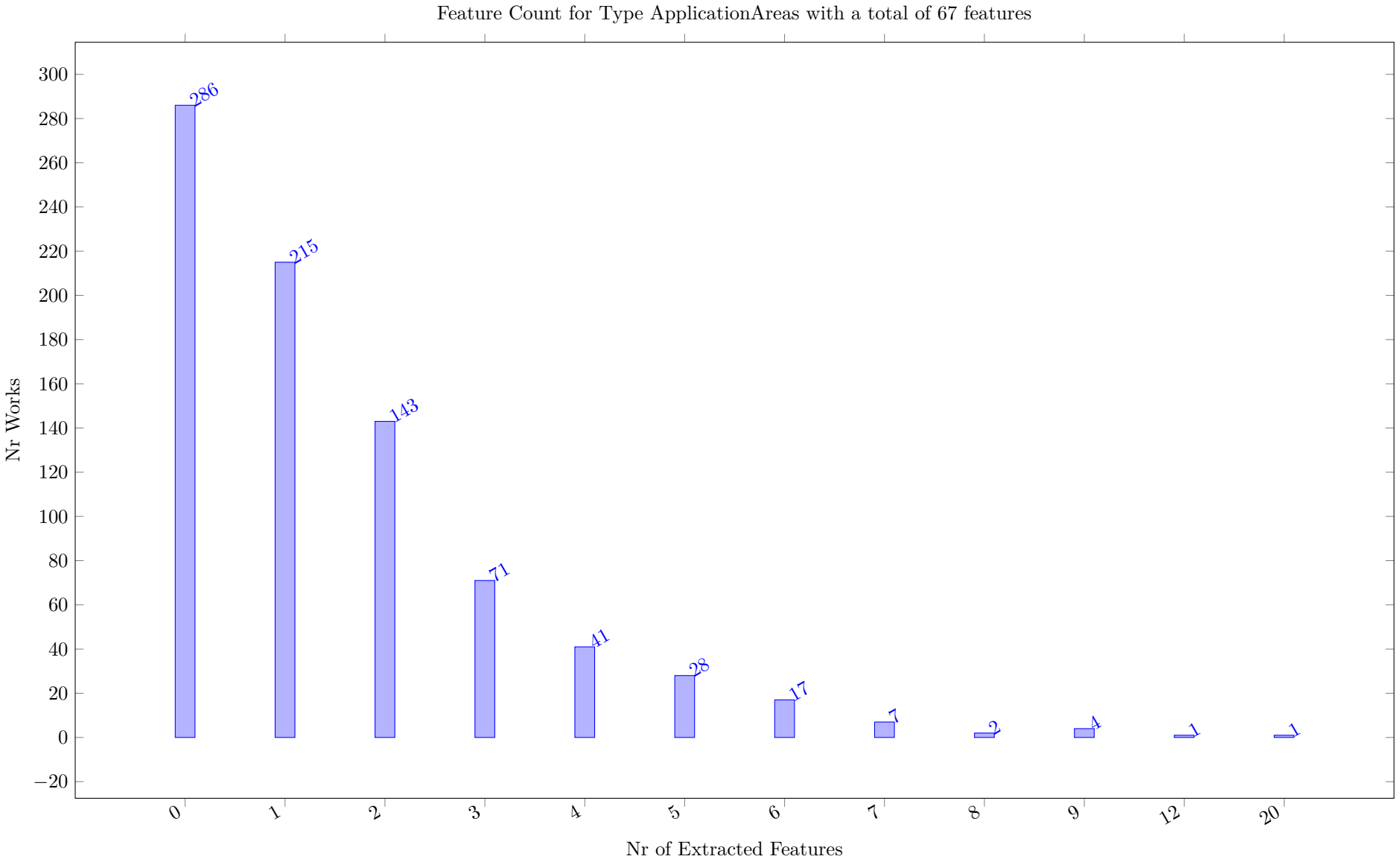

Feature Count for Type Scheduling with a total of 7 features
Nr Works
Nr of Extracted Features
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
−20
0
1
2
3
4
5
6
7
5
6
27
53
90
194
260
181

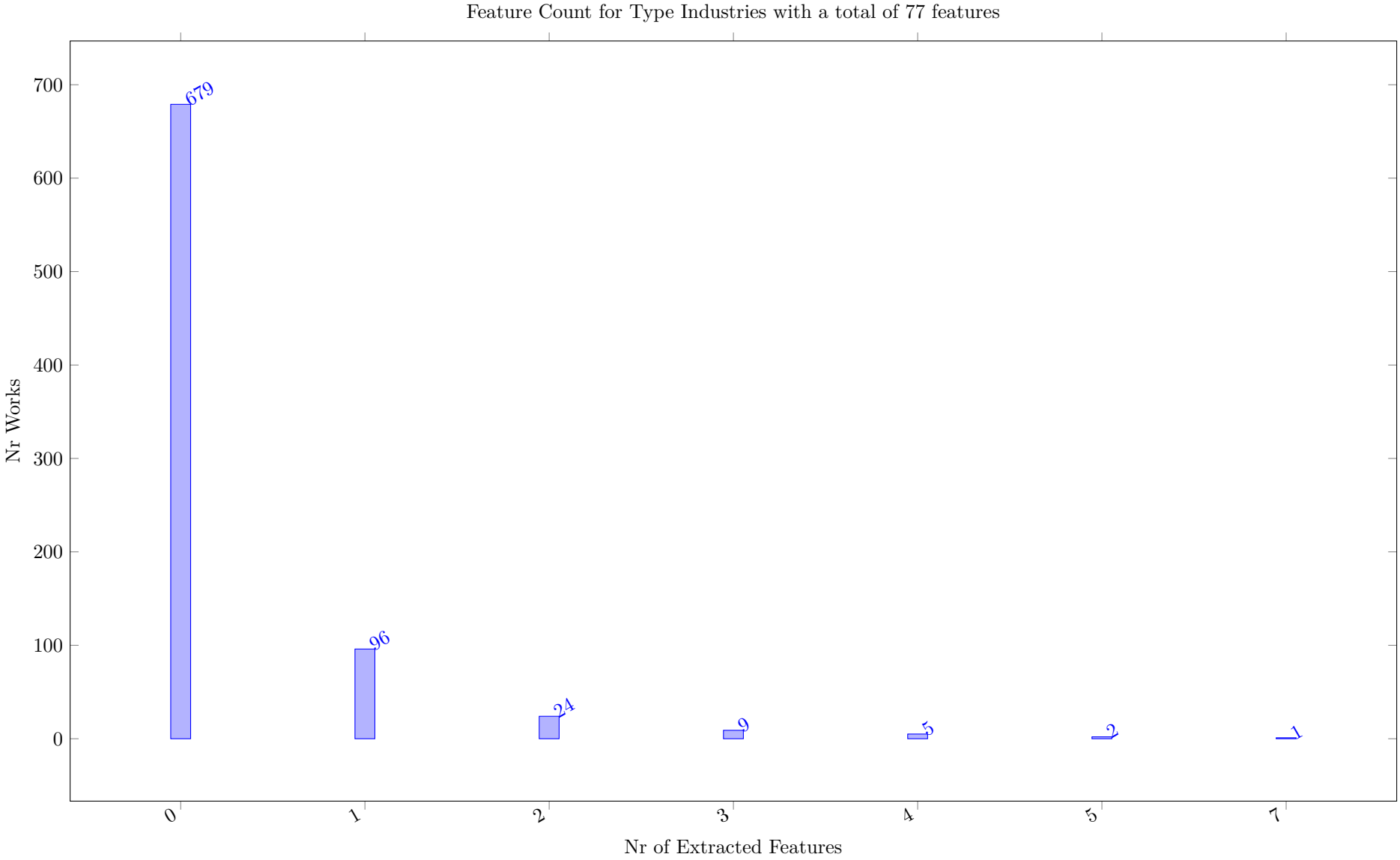

Feature Count for Type CP with a total of 9 features
Nr Works
0
20
40
60
80
100
120
140
160
180
200
220
12
47
143
217
159
121
69
37
11
0
1
2
3
4
5
6
7
8
Nr of Extracted Features

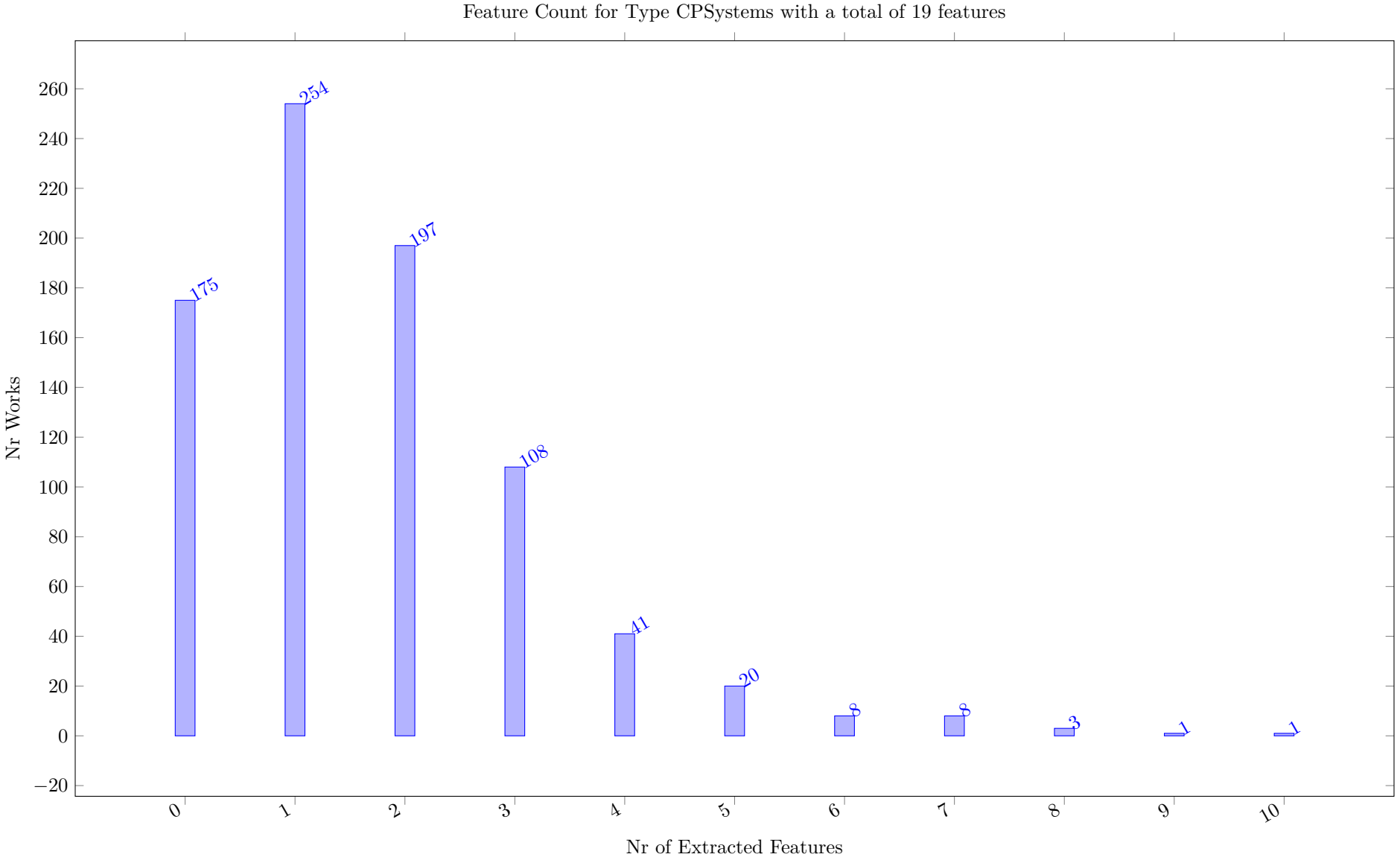

Feature Count for Type Concepts with a total of 64 features
Nr Works
Nr of Extracted Features
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 30 38
27 43 54 59 71 63 74 65 62 52 43 33 19 36 27 15 12 14 8 9 10 5 1 4 1 1 2 1 3 1 1

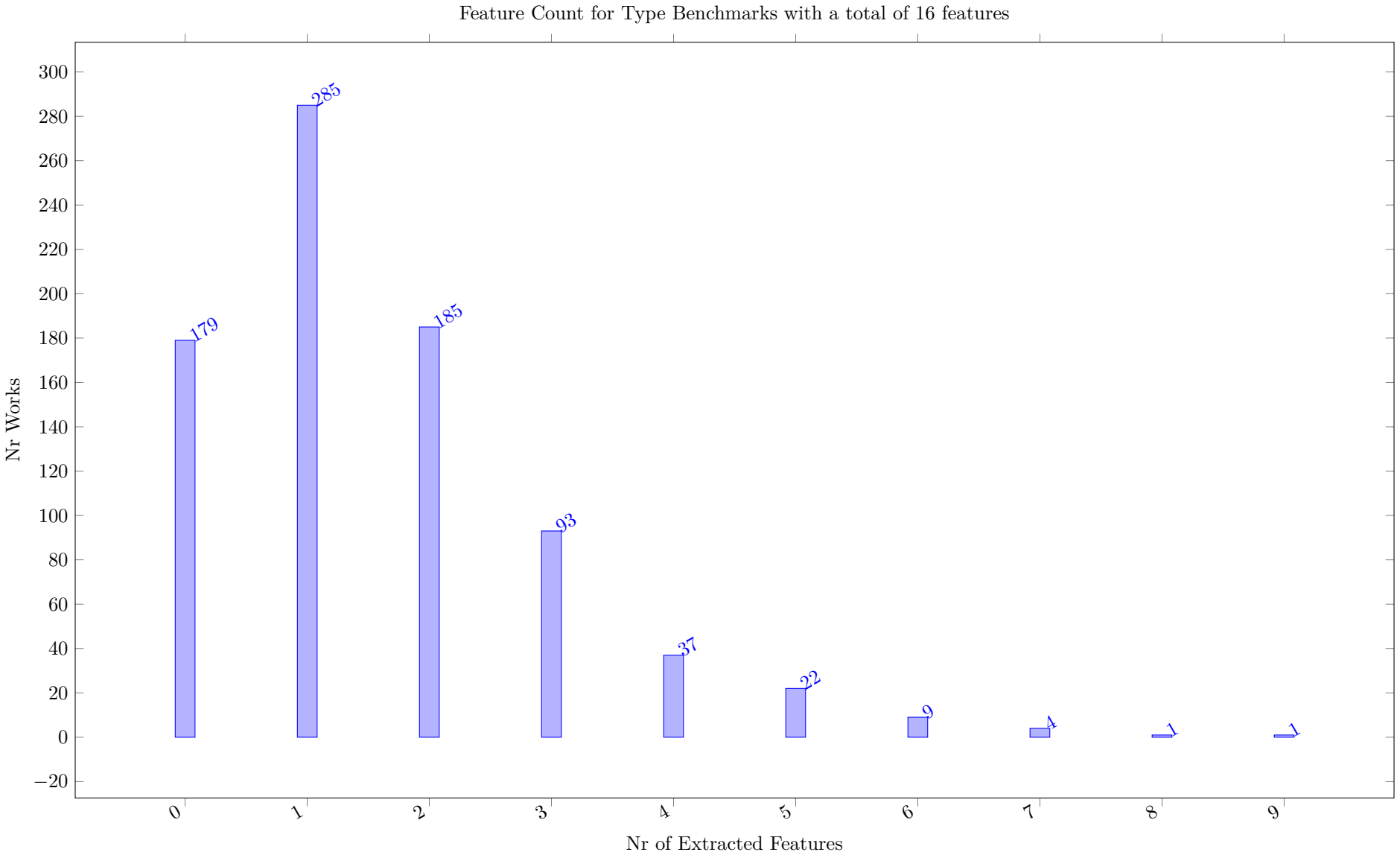

Feature Count for Type Classification with a total of 48 features
Nr Works
Nr of Extracted Features
0
50
100
150
200
250
300
350
400
0
1
2
3
4
5
6
7
9
11
388
164
123
80
41
7
6
4
2
1

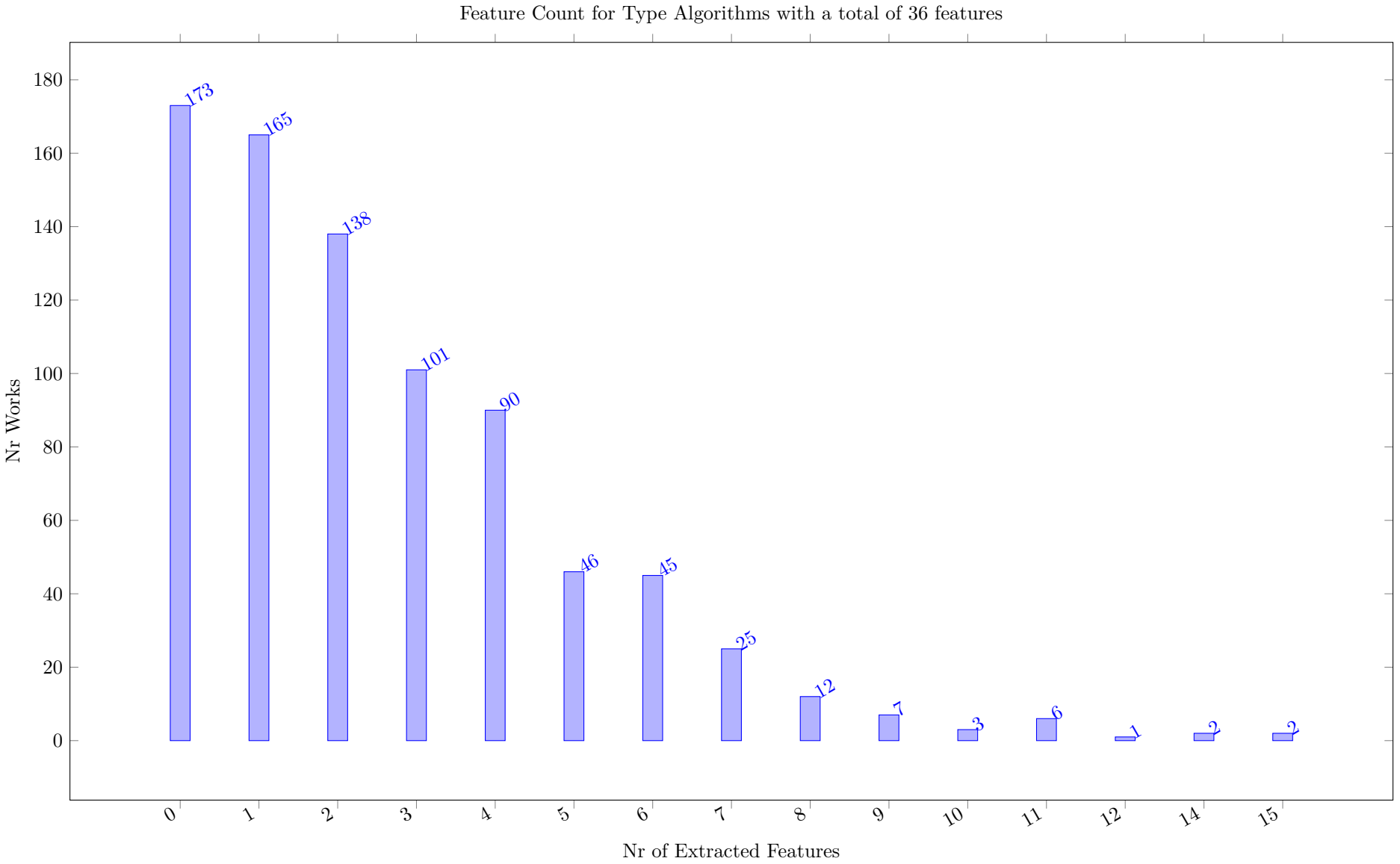

Feature Count for Type Constraints with a total of 63 features
Nr Works
Nr of Extracted Features
0
20
40
60
80
100
120
140
160
180
128
177
176
143
91
38
22
14
13
2
3
3
3
1
2
0
1
2
3
4
5
6
7
8
9
10
11
12
14
19


Feature Count for Type ApplicationAreas with a total of 67 features
Nr Works
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
−20
286
215
143
71
41
28
17
7
2
4
1
1
0
1
2
3
4
5
6
7
8
9
12
20
Nr of Extracted Features


Feature Count for Type Industries with a total of 77 features
Nr Works
700
600
500
400
300
200
100
0
679
96
24
9
5
2
1
0
1
2
3
4
5
7
Nr of Extracted Features


Feature Count for Type CPSystems with a total of 19 features
Nr Works
Nr of Extracted Features
260
240
220
200
180
160
140
120
100
80
60
40
20
0
−20
0
1
2
3
4
5
6
7
8
9
10
175
254
197
108
41
20
8
8
3
1
1


Feature Count for Type Benchmarks with a total of 16 features
Nr Works
Nr of Extracted Features
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
−20
0
1
2
3
4
5
6
7
8
9
179
285
185
93
37
22
9
4
1
1

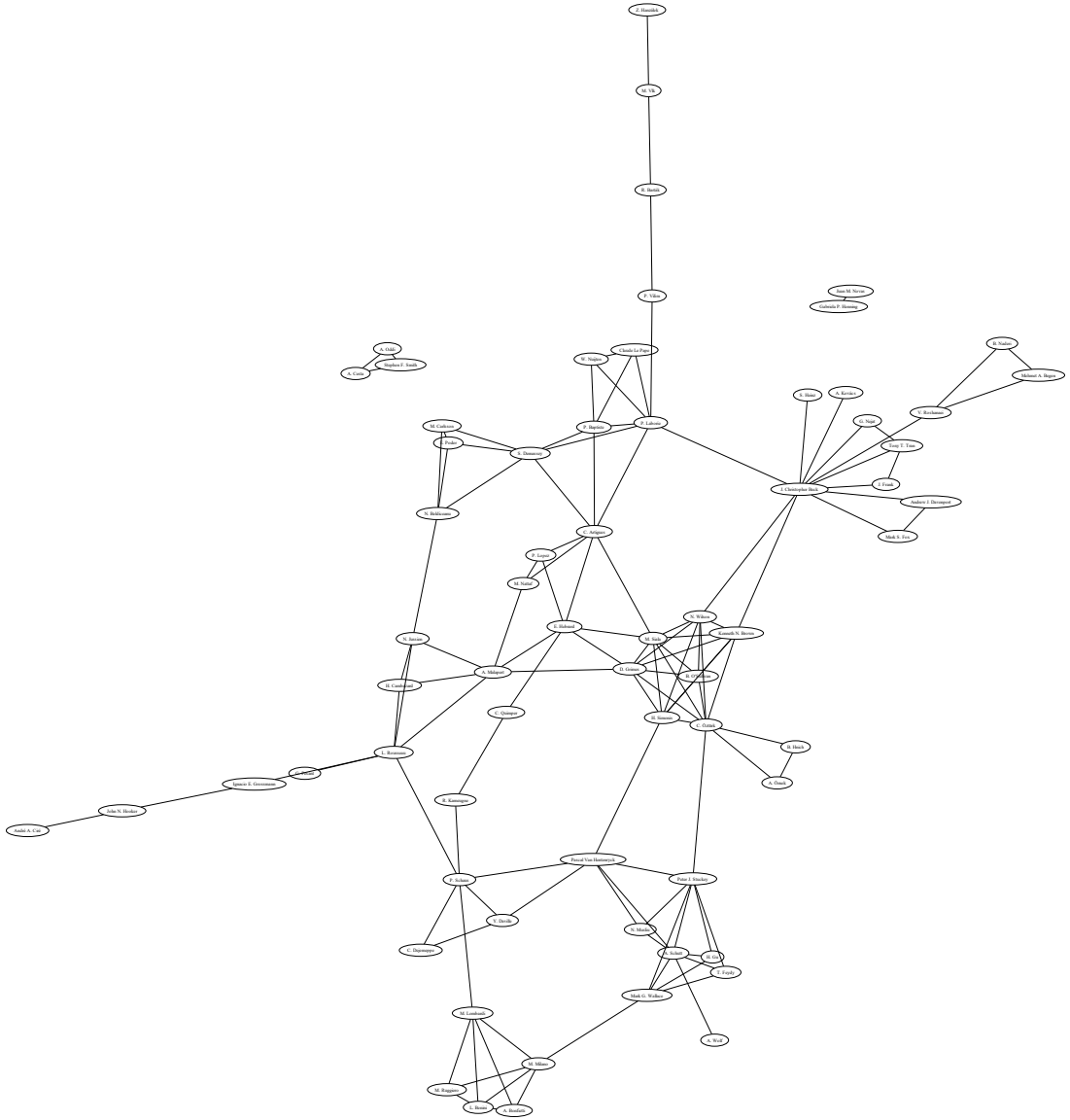

Feature Count for Type Algorithms with a total of 36 features
Nr Works
0
20
40
60
80
100
120
140
160
180
173
165
138
101
90
46
45
25
12
7
3
6
1
2
2
0
1
2
3
4
5
6
7
8
9
10
11
12
14
15
Nr of Extracted Features

# 13 Coauthor graph

The coauthor plot is created by graphviz, and is based on the coauthor relations extracted from the author fields of the works. Authors with few works are not shown, to avoid a cluttered view. Note that this analysis depends on the use of canonical forms of author names. If bib entries come from any different sources, we will need to check this manually. DBLP seems to be using ORCID values and typically identifies the authors of a work with a canonical representation of their name. Accents and umlauts are other sources of having multiple forms of the name of the same author. Note that the risk of two different authors using the same name should be low for very specific literature surveys, but cannot be checked with the data sources currently used.

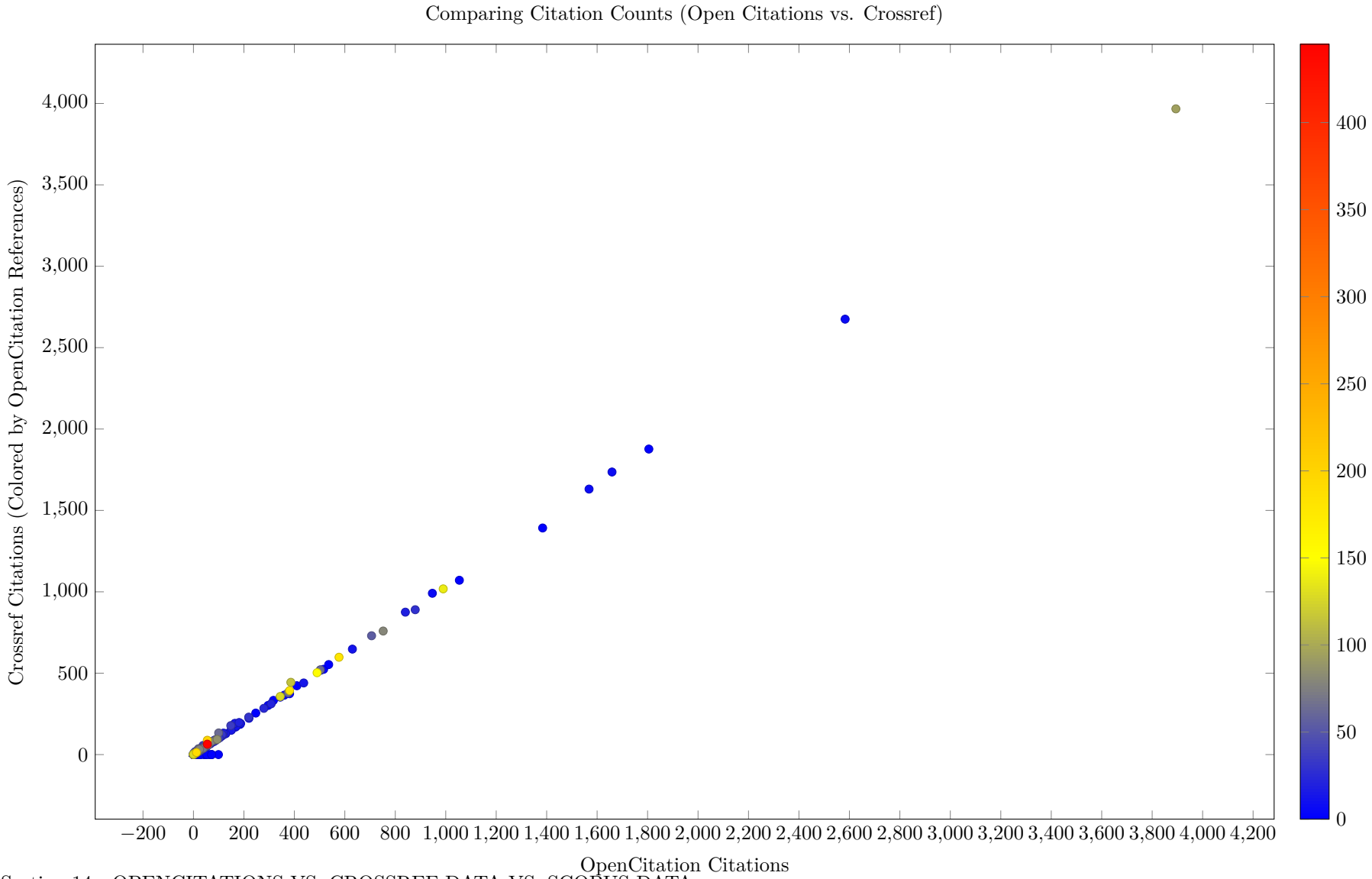
The plots can be made with different layout tools in graphviz, it seems that fdp produces the most consistent visually attractive plots for this type of display. This probably needs more work on parameter settings to be fully automated.

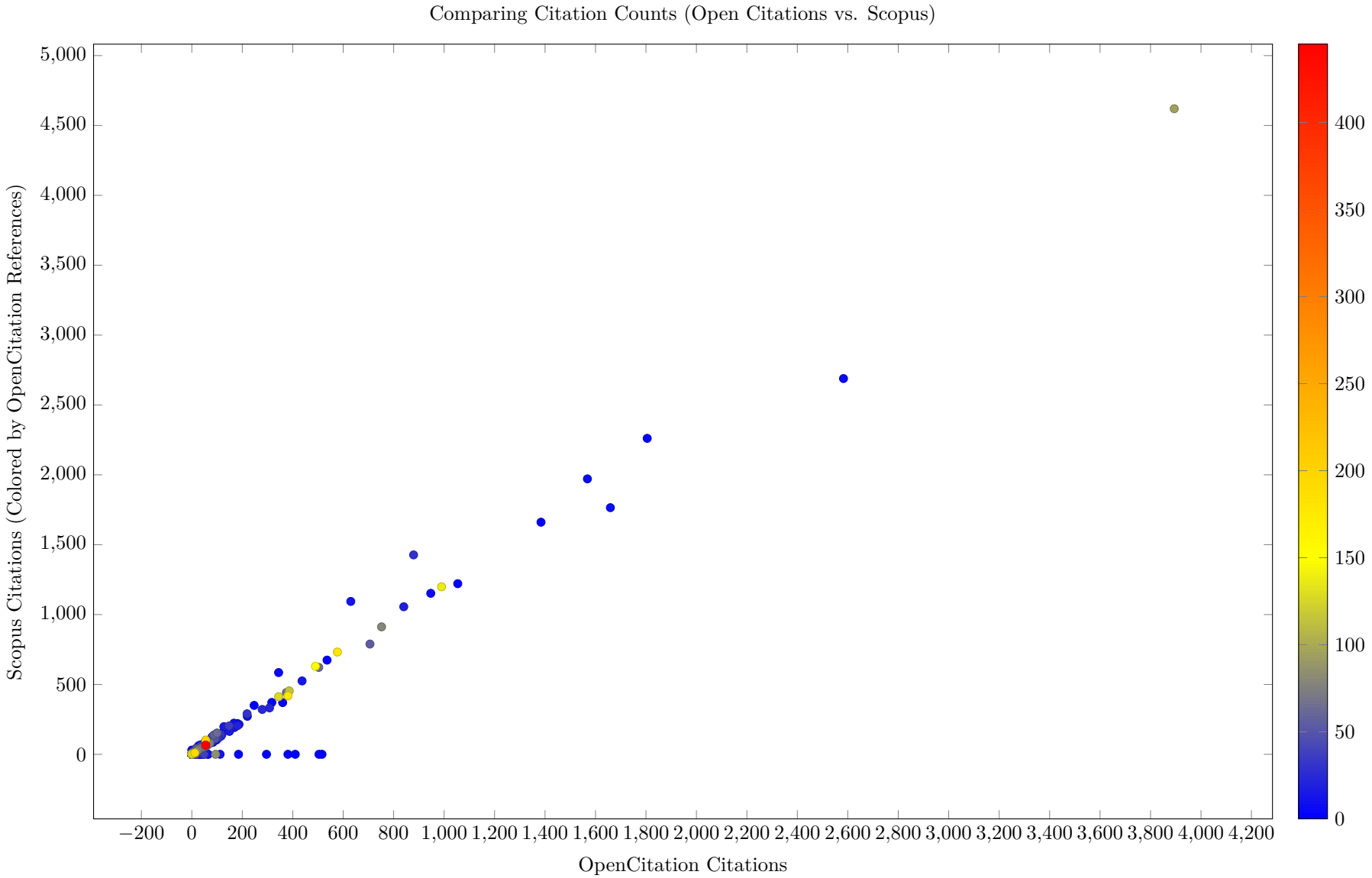
Figure 1: Coauthor Graph Drawn with fdp (Graphviz)

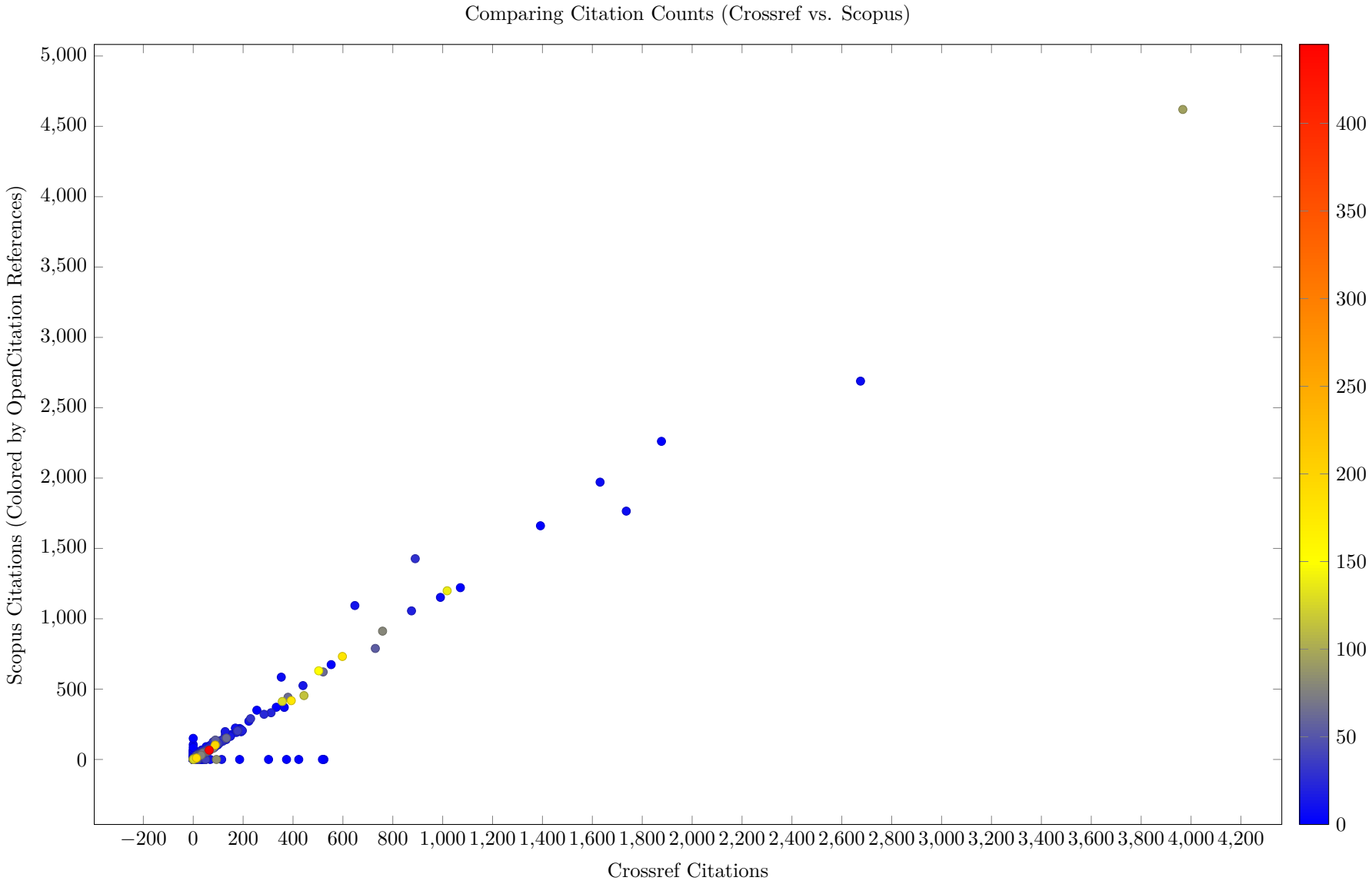


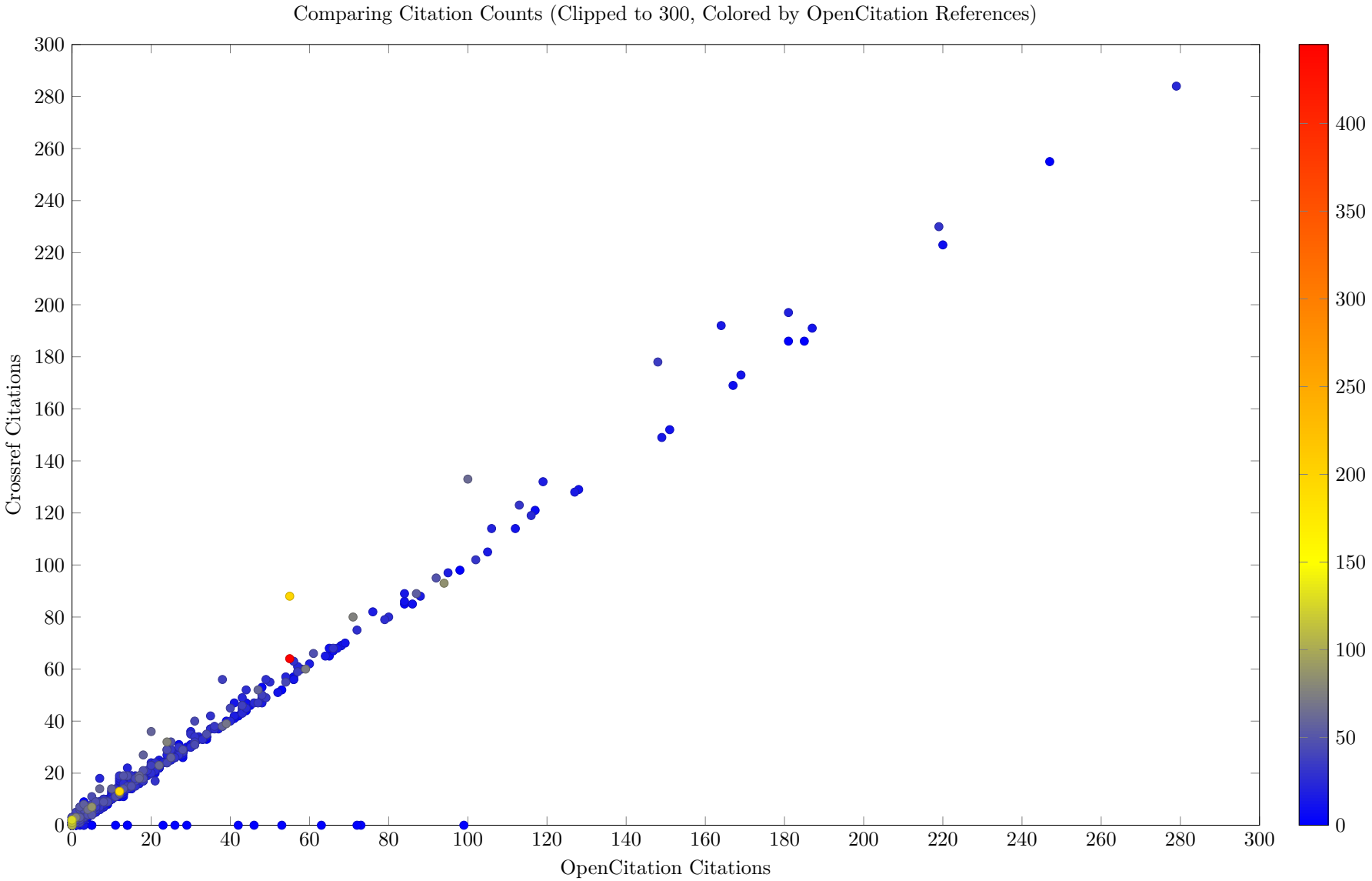
# 14 OpenCitations vs. Crossref Data vs. Scopus Data

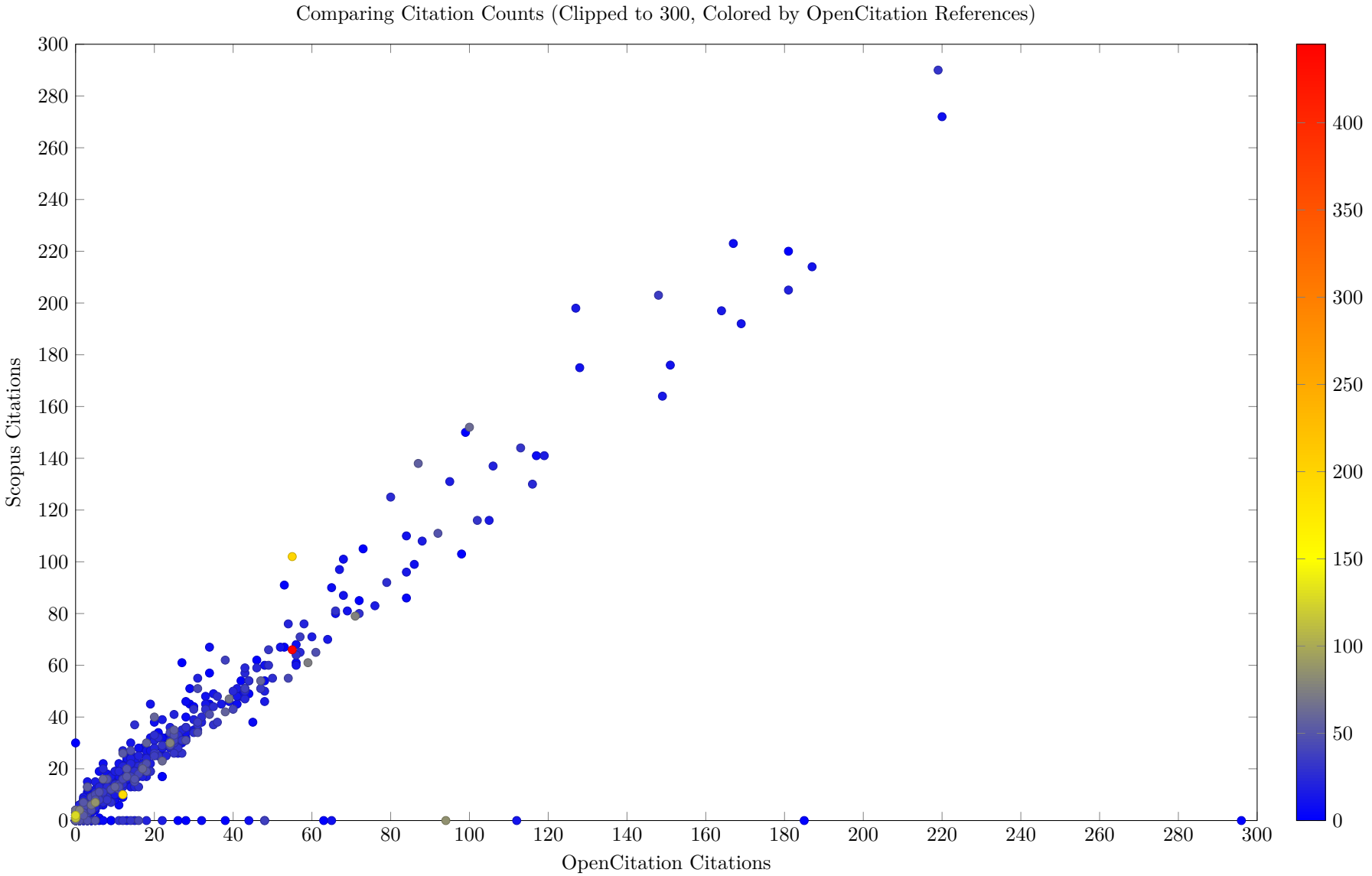
## 14.1 Citation Comparison

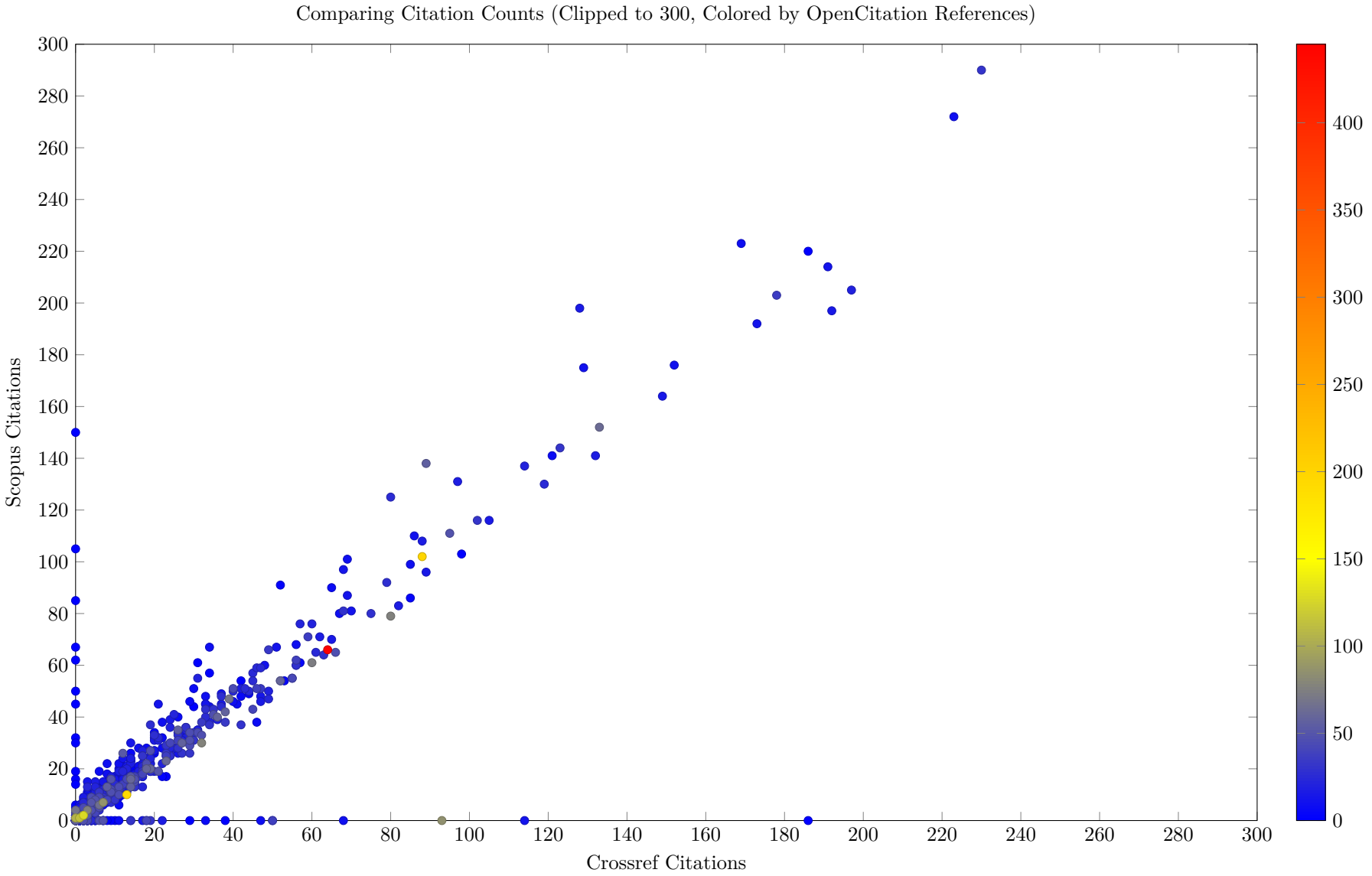



Comparing Citation Counts (Open Citations vs. Scopus)
Scopus Citations (Colored by OpenCitation References)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
−200 0 200 400 600 800 1,000 1,200 1,400 1,600 1,800 2,000 2,200 2,400 2,600 2,800 3,000 3,200 3,400 3,600 3,800 4,000 4,200
OpenCitation Citations
400
350
300
250
200
150
100
50
0

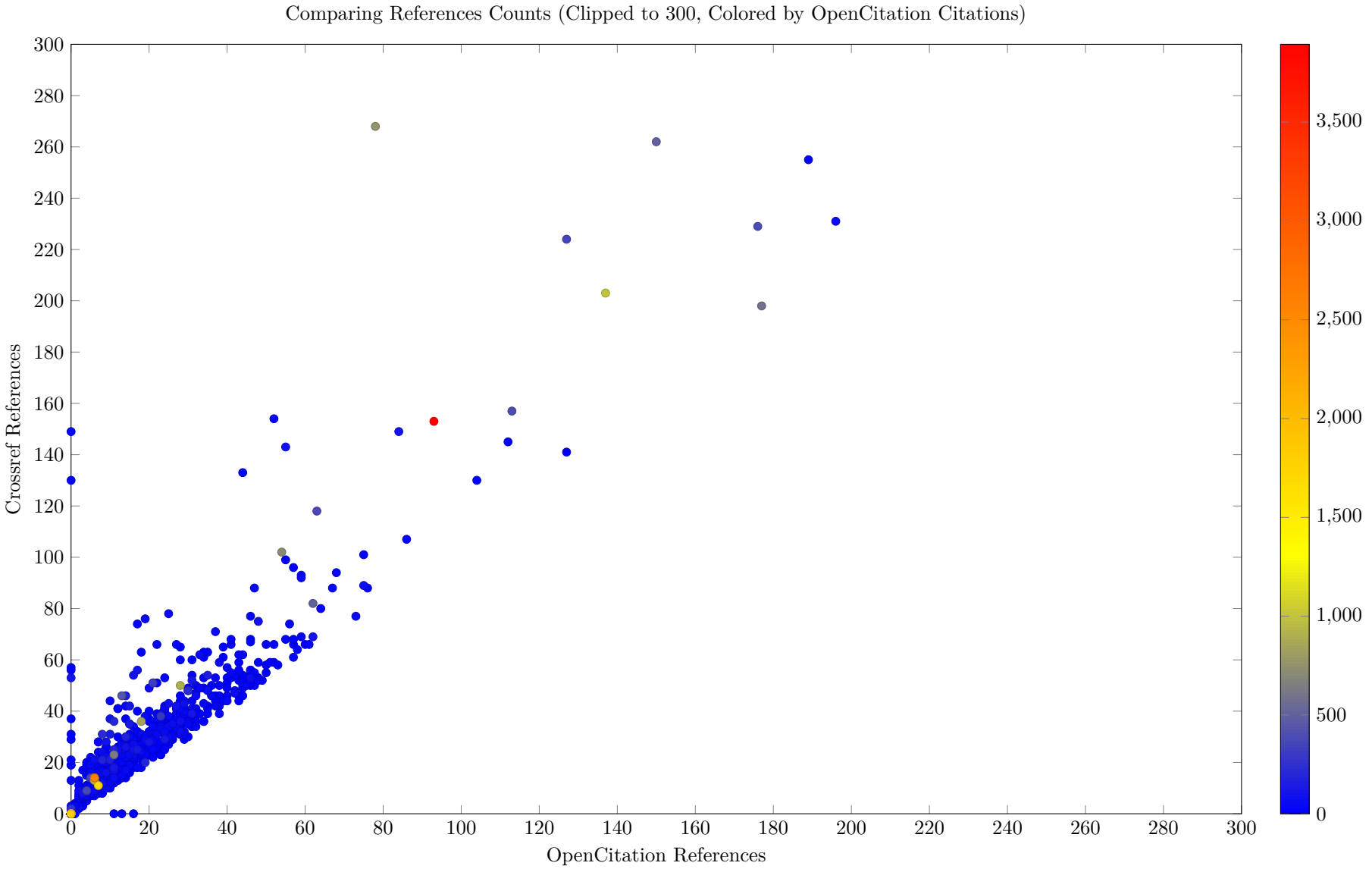

Comparing Citation Counts (Crossref vs. Scopus)
Scopus Citations (Colored by OpenCitation References)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
−200 0 200 400 600 800 1,000 1,200 1,400 1,600 1,800 2,000 2,200 2,400 2,600 2,800 3,000 3,200 3,400 3,600 3,800 4,000 4,200
Crossref Citations
400
350
300
250
200
150
100
50
0


Comparing Citation Counts (Clipped to 300, Colored by OpenCitation References)
Crossref Citations
OpenCitation Citations
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
0
50
100
150
200
250
300
350
400

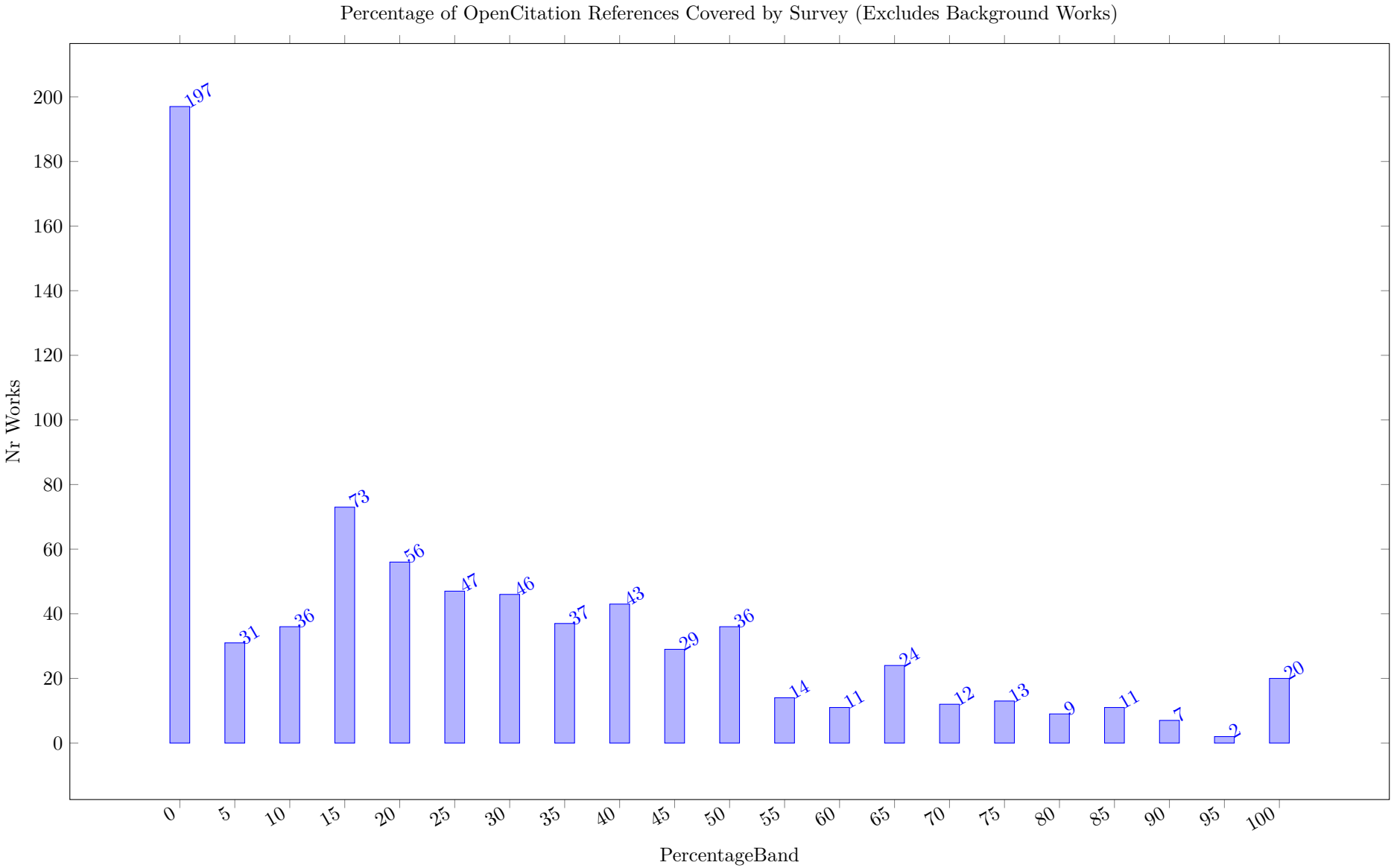

Comparing Citation Counts (Clipped to 300, Colored by OpenCitation References)
Scopus Citations
OpenCitation Citations
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
0
50
100
150
200
250
300
350
400

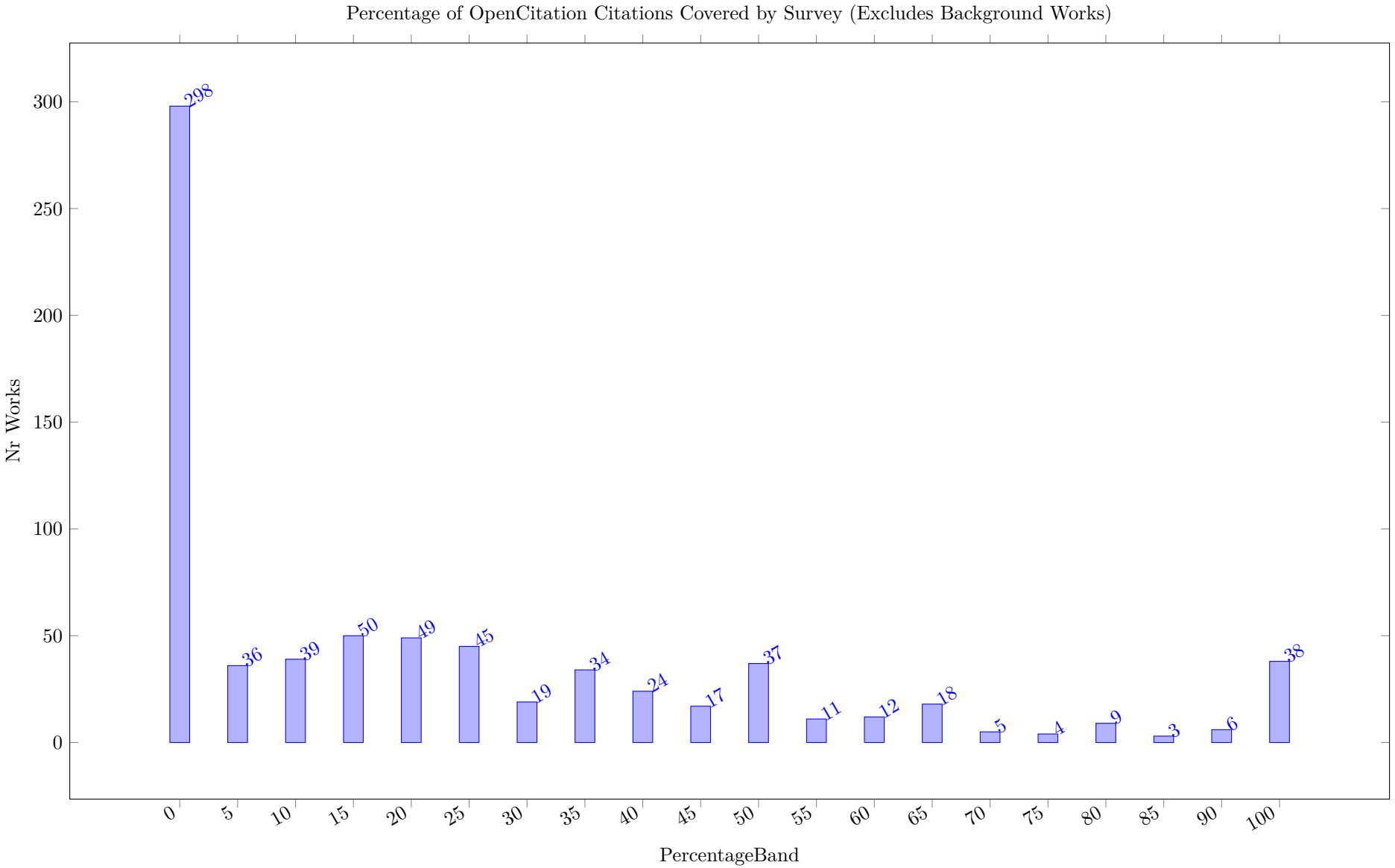

Comparing Citation Counts (Clipped to 300, Colored by OpenCitation References)
Scopus Citations
Crossref Citations
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
0
50
100
150
200
250
300
350
400

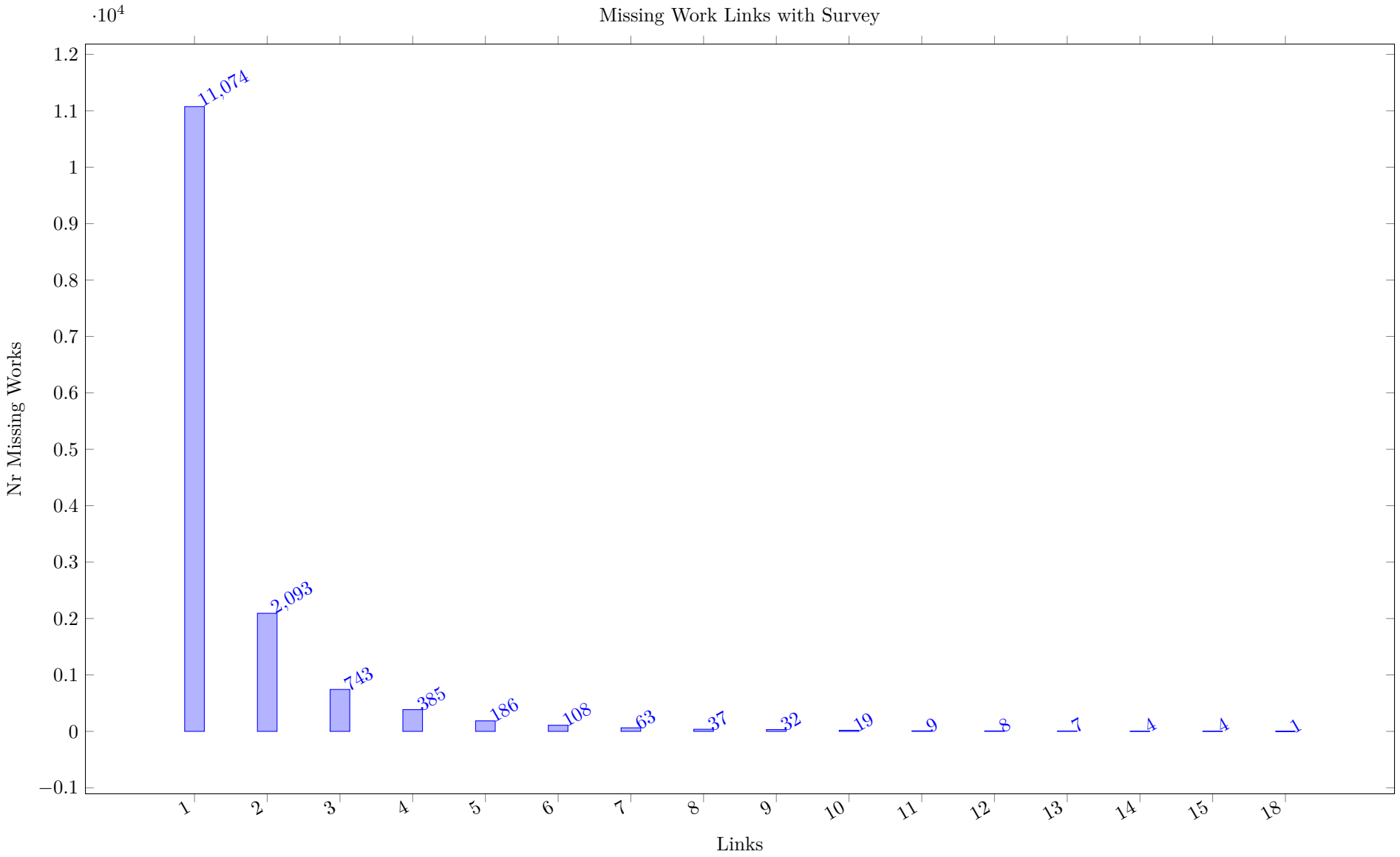
## 14.2 References Comparison



### 14.3 Percentage Cover




Percentage of OpenCitation Citations Covered by Survey (Excludes Background Works)
Nr Works
PercentageBand
0
50
100
150
200
250
300
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
100
298
36
39
50
49
45
19
34
24
17
37
11
12
18
5
4
9
3
6
38


Missing Work Links with Survey
$\cdot 10^4$
Nr Missing Works
Links
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
−0.1
11,074
2,093
743
385
186
108
63
37
32
19
9
8
7
4
4
1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
18

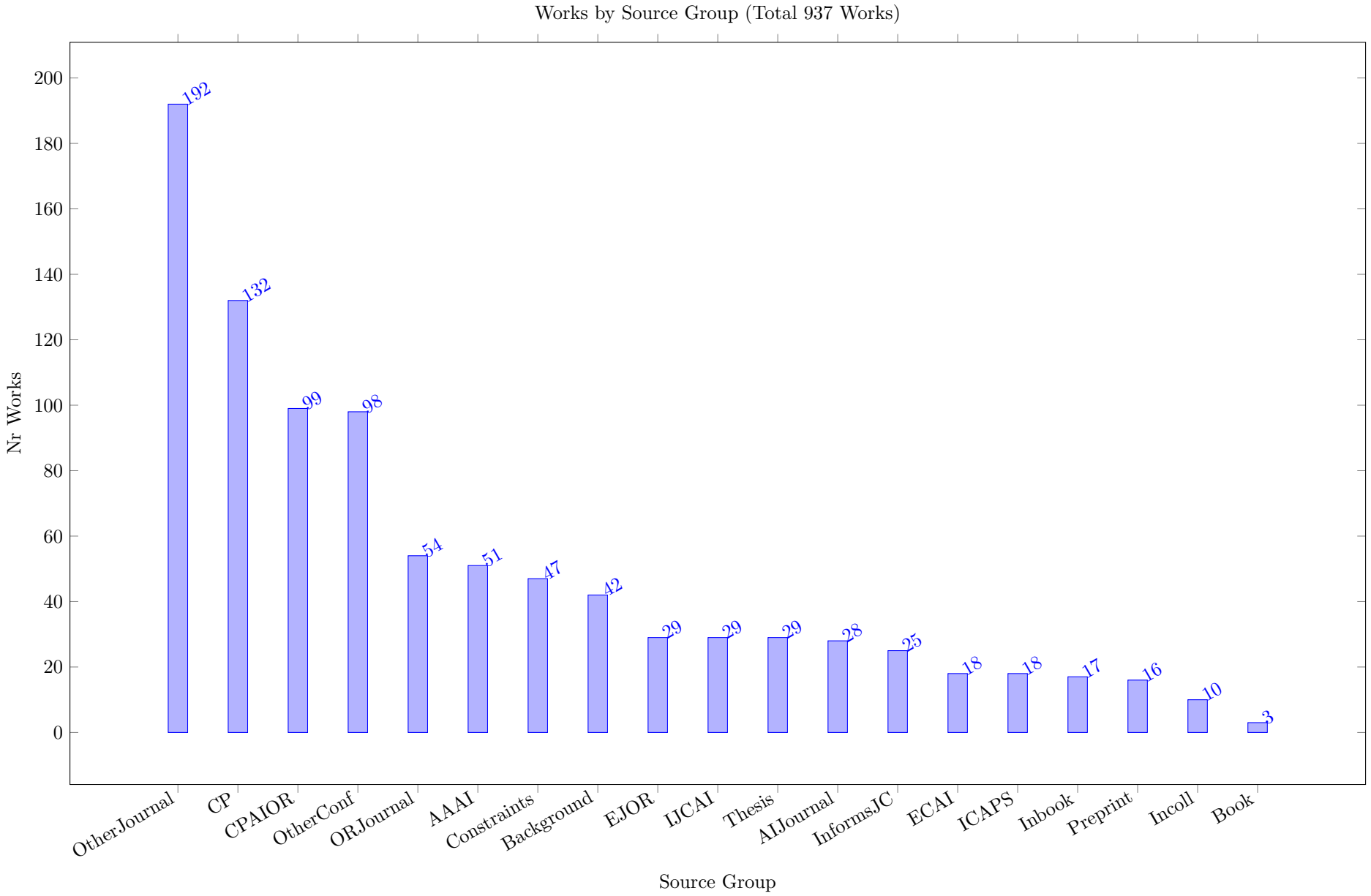
# 15 Citations by Year and Source Group

We have defined a number of source groups to group publications of a given type together, without using the full conference series and journal distinctions for grouping. The following table lists all defined source groups for this survey. Adding groups requires updates to the source code.

Table 11: Source Groups

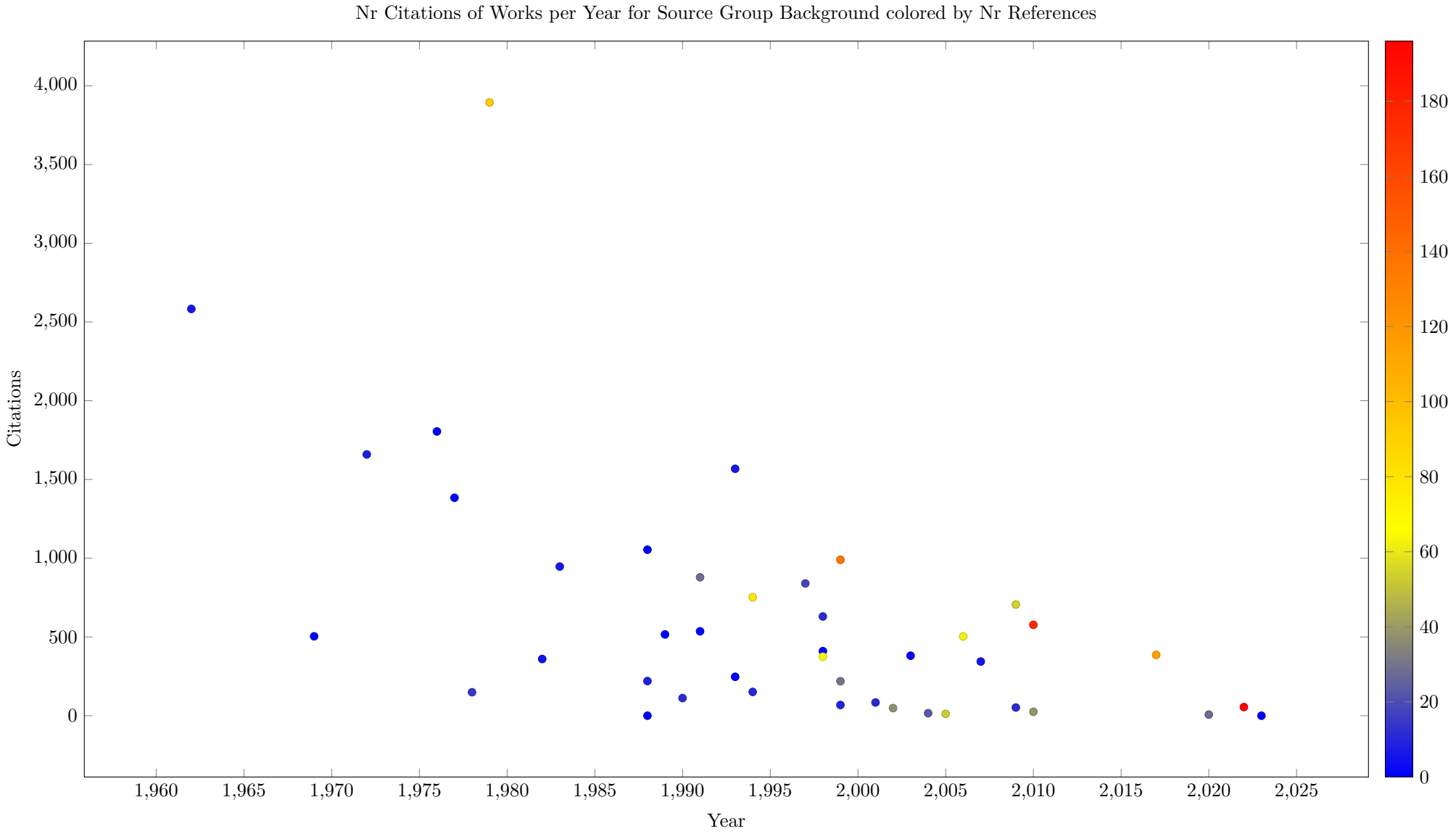
| Name | Description |
|---|---|
| Background | Background material |
| CP | The CP conference (from 1995) |
| CPAIOR | The CPAIOR conference (starting 2004) |
| ICAPS | The ICAPS conference |
| AAAI | AAAI conference |
| IJCAI | IJCAI Conference |
| ECAI | ECAI Conference |
| OtherConf | Any other conference |
| Constraints | The Constraint Journal |
| EJOR | The European Journal on Operations Research |
| InformsJC | The Informs Journal on Computing |
| AIJournal | Other AI Journals |
| ORJournal | Other OR Journals |
| Preprint | A non reviewed preprint |
| OtherJournal | Any other Journal |
| Book | A book |
| Inbook | Chapter in a Book |
| Incoll | Chapter in a Collection |
| Thesis | A thesis |
| Other | Any other published work |

The first plot in this section shows how many works in each source group have been published. This considers the complete time period of the survey.

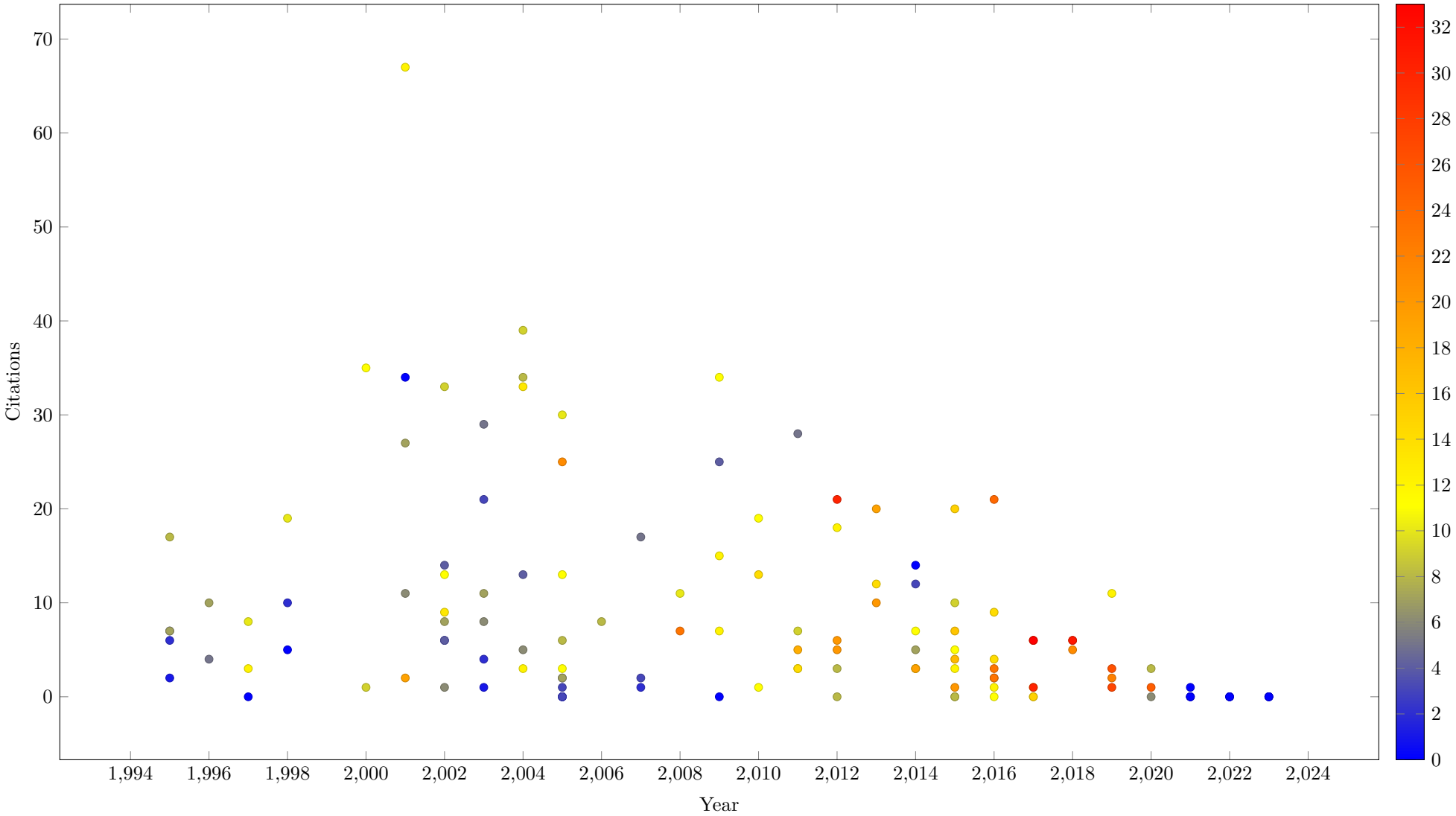

Works by Source Group (Total 937 Works)
Nr Works
0
20
40
60
80
100
120
140
160
180
200
192
132
99
98
54
51
47
42
29
29
29
28
25
18
18
17
16
10
3
OtherJournal
CP
CPAIOR
OtherConf
ORJournal
AAAI
Constraints
Background
EJOR
IJCAI
Thesis
AIJournal
InformsJC
ECAI
ICAPS
Inbook
Preprint
Incoll
Book
Source Group

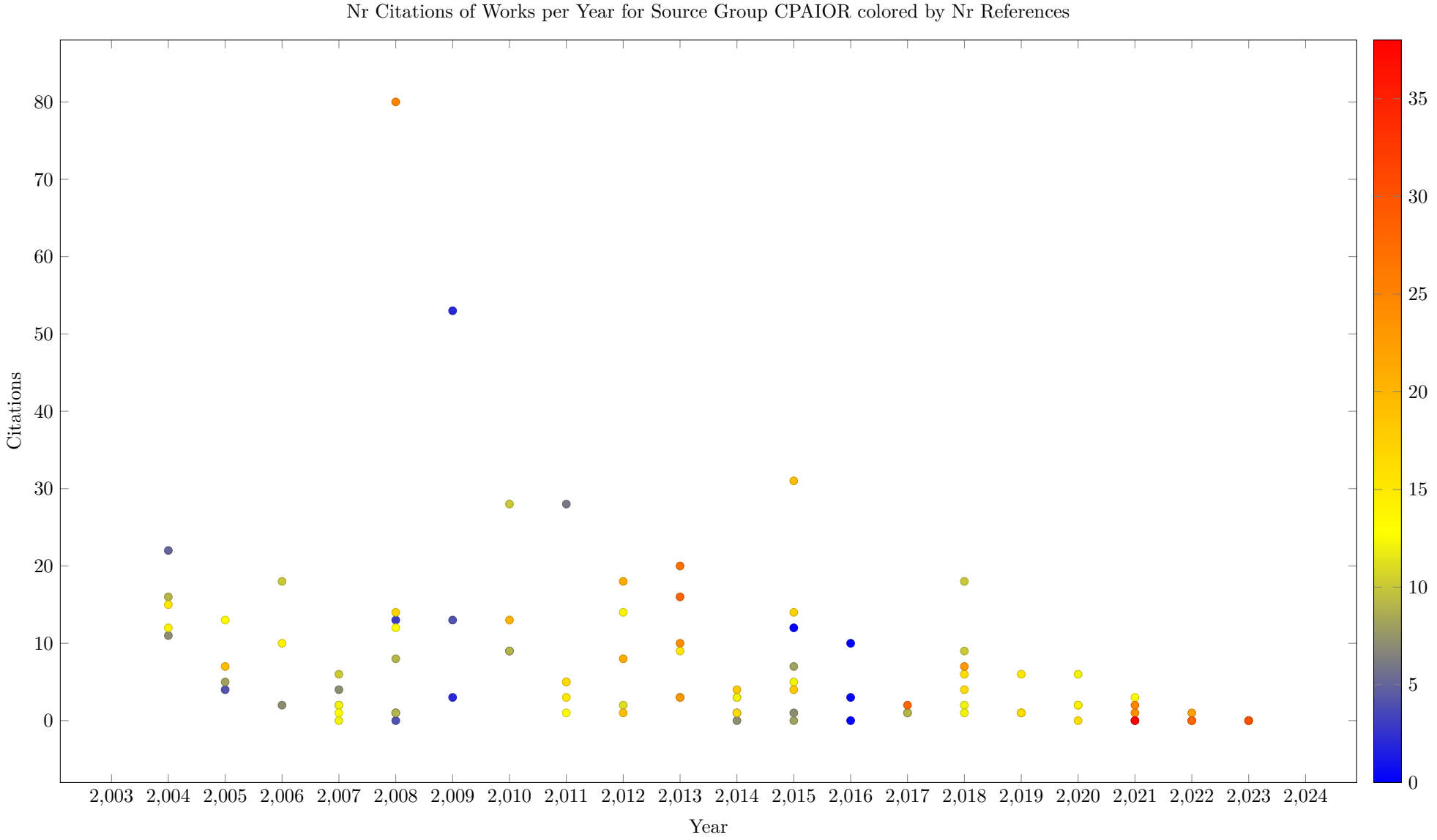
## 15.1 Source Group Citations by Year

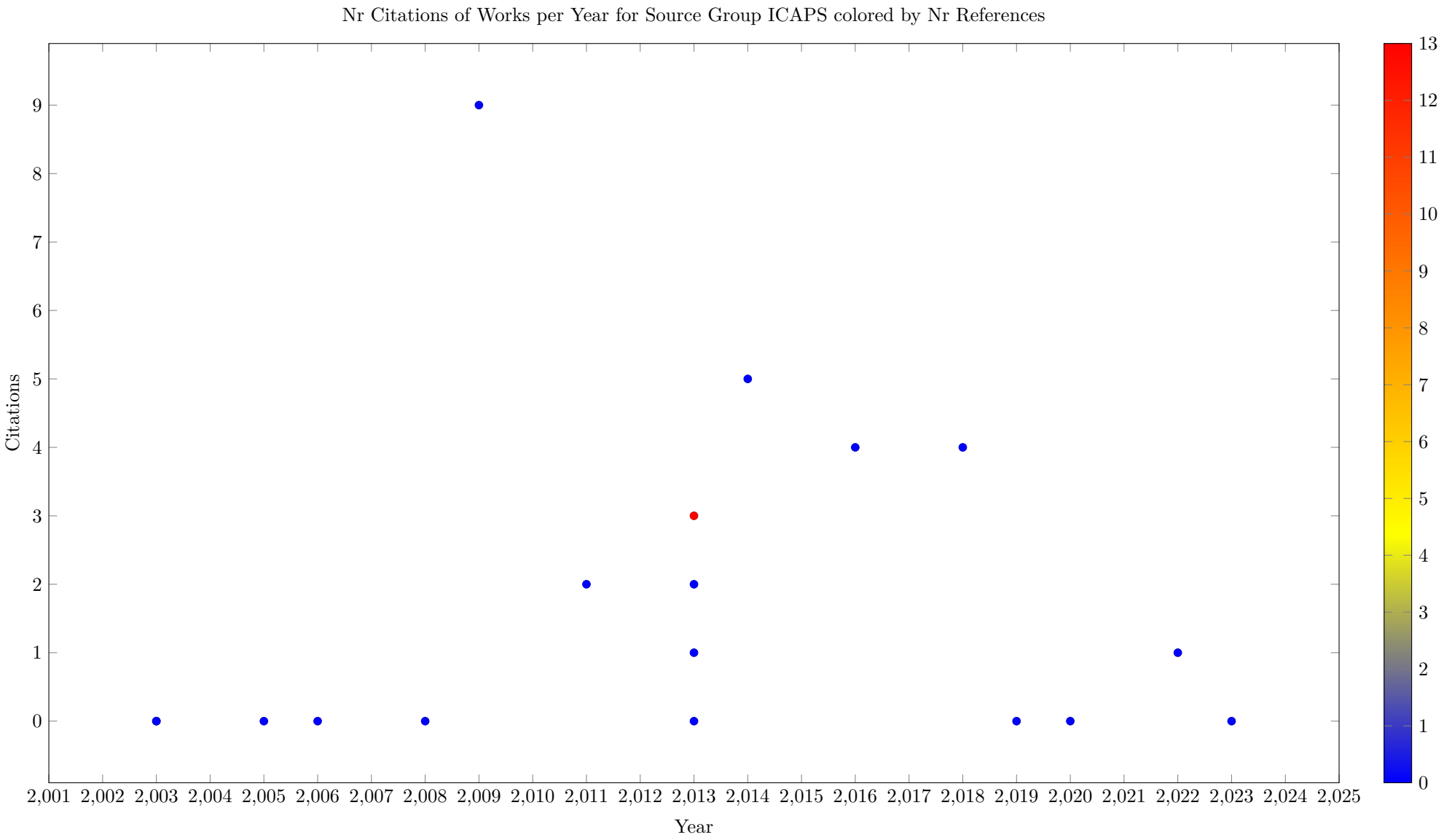
We plot for each source group the number of citations obtained by papers published in a given year. This plot gives both an indication in which period the source group was active, and how significant the works in the source are. It is of course natural that more recent papers have fewer citations than papers published many tears ago.

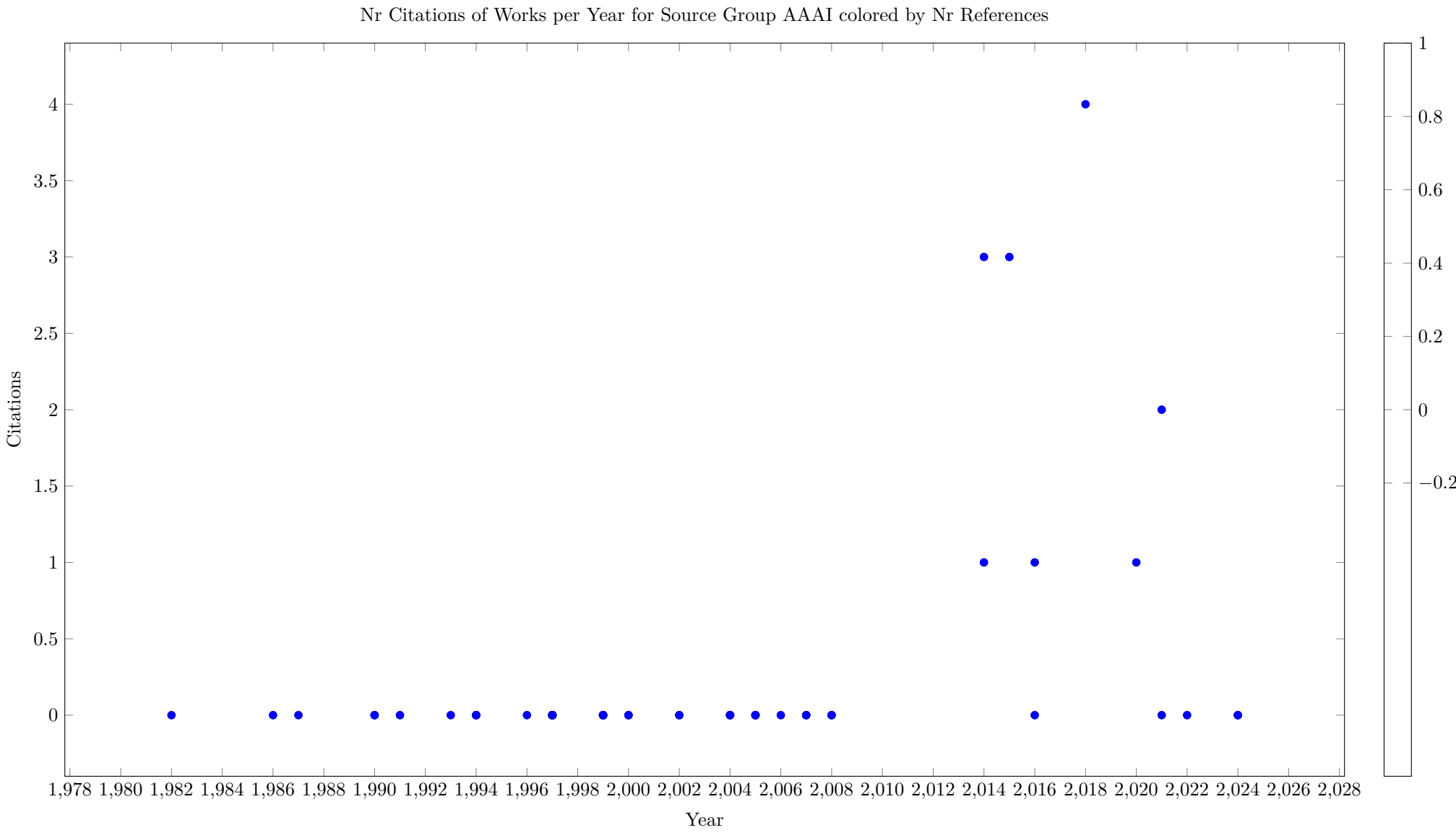

Nr Citations of Works per Year for Source Group Background colored by Nr References
Citations
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1,960
1,965
1,970
1,975
1,980
1,985
1,990
1,995
2,000
2,005
2,010
2,015
2,020
2,025
Year
180
160
140
120
100
80
60
40
20
0

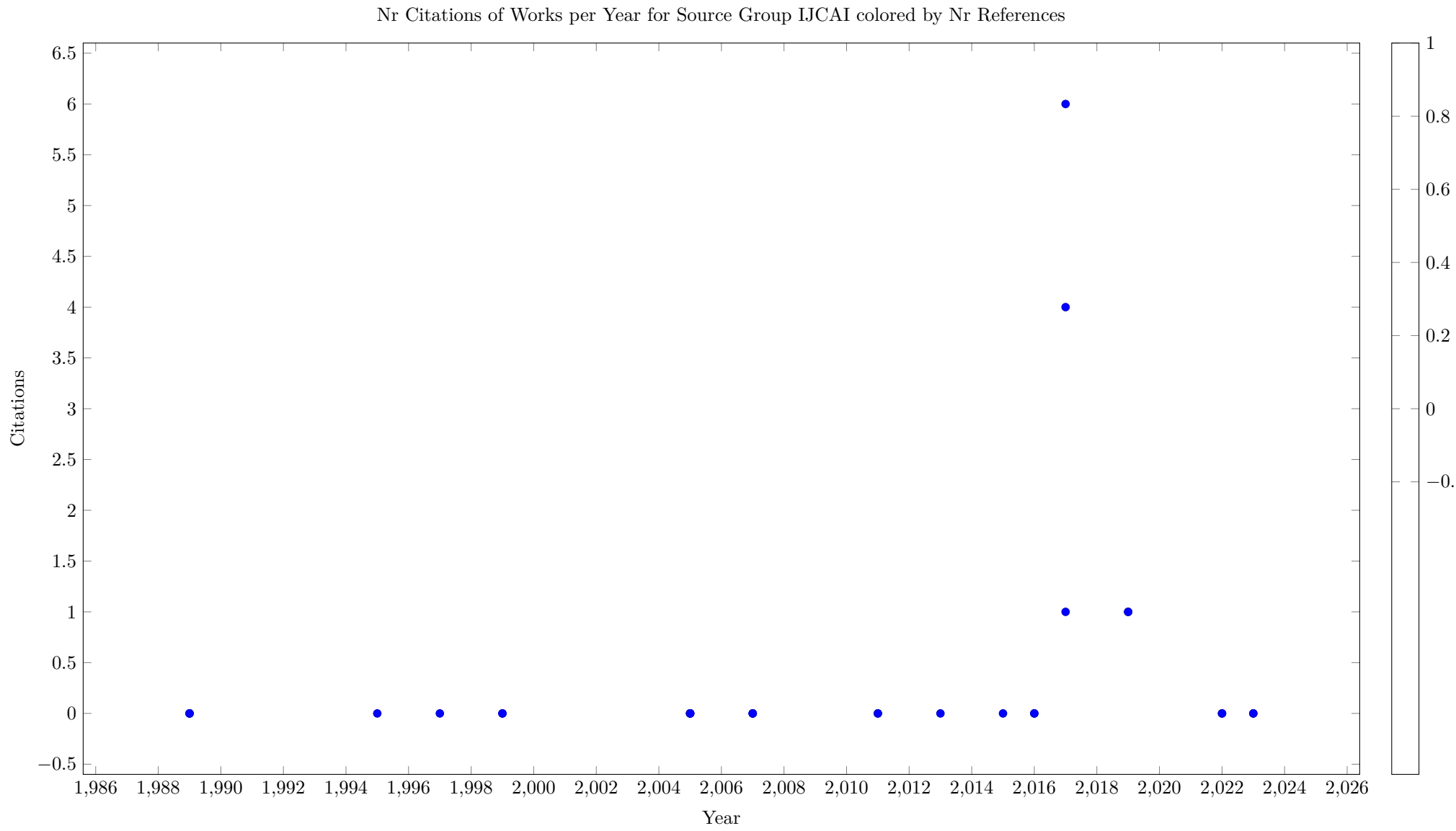
Nr Citations of Works per Year for Source Group CP colored by Nr References

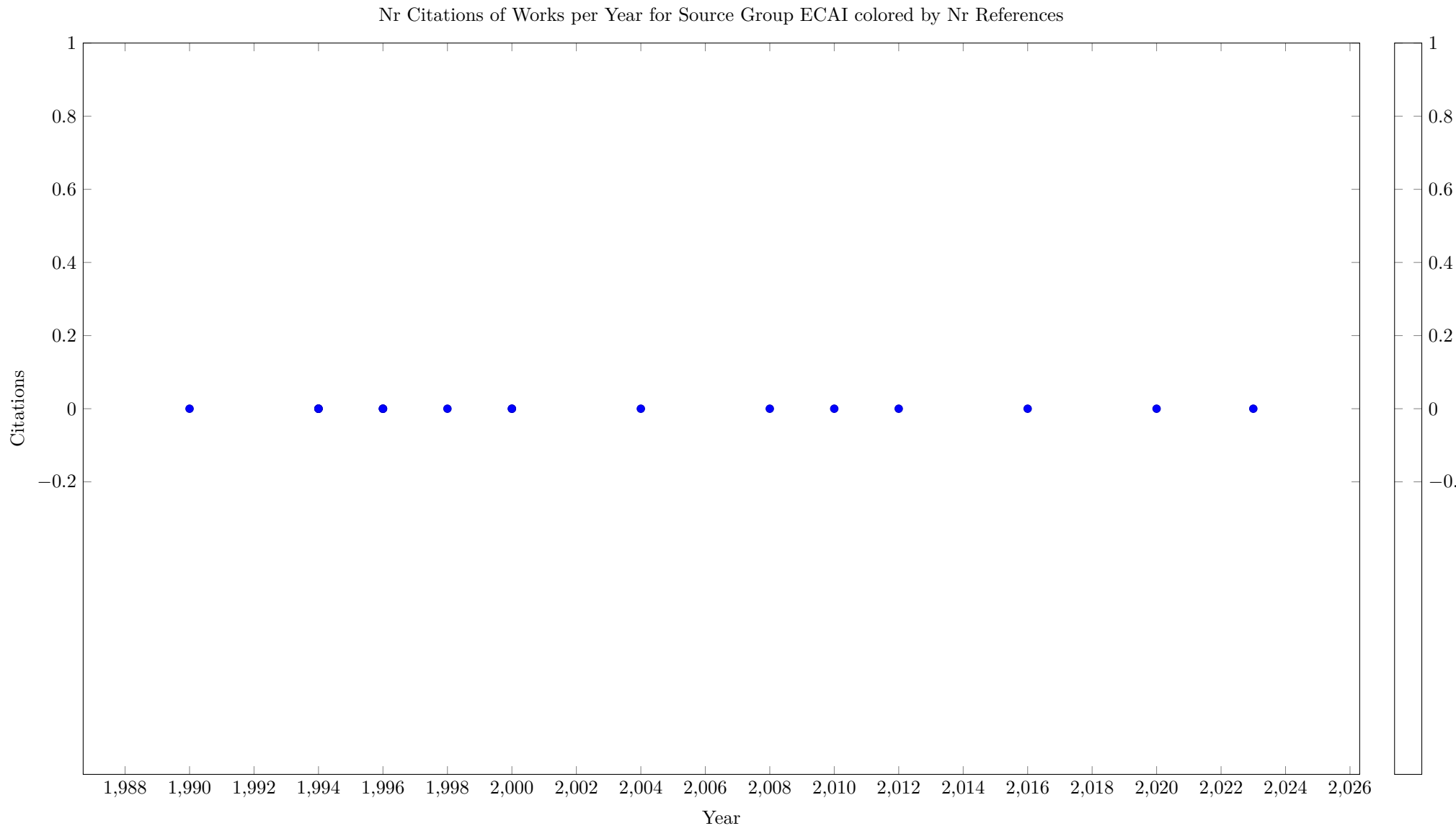


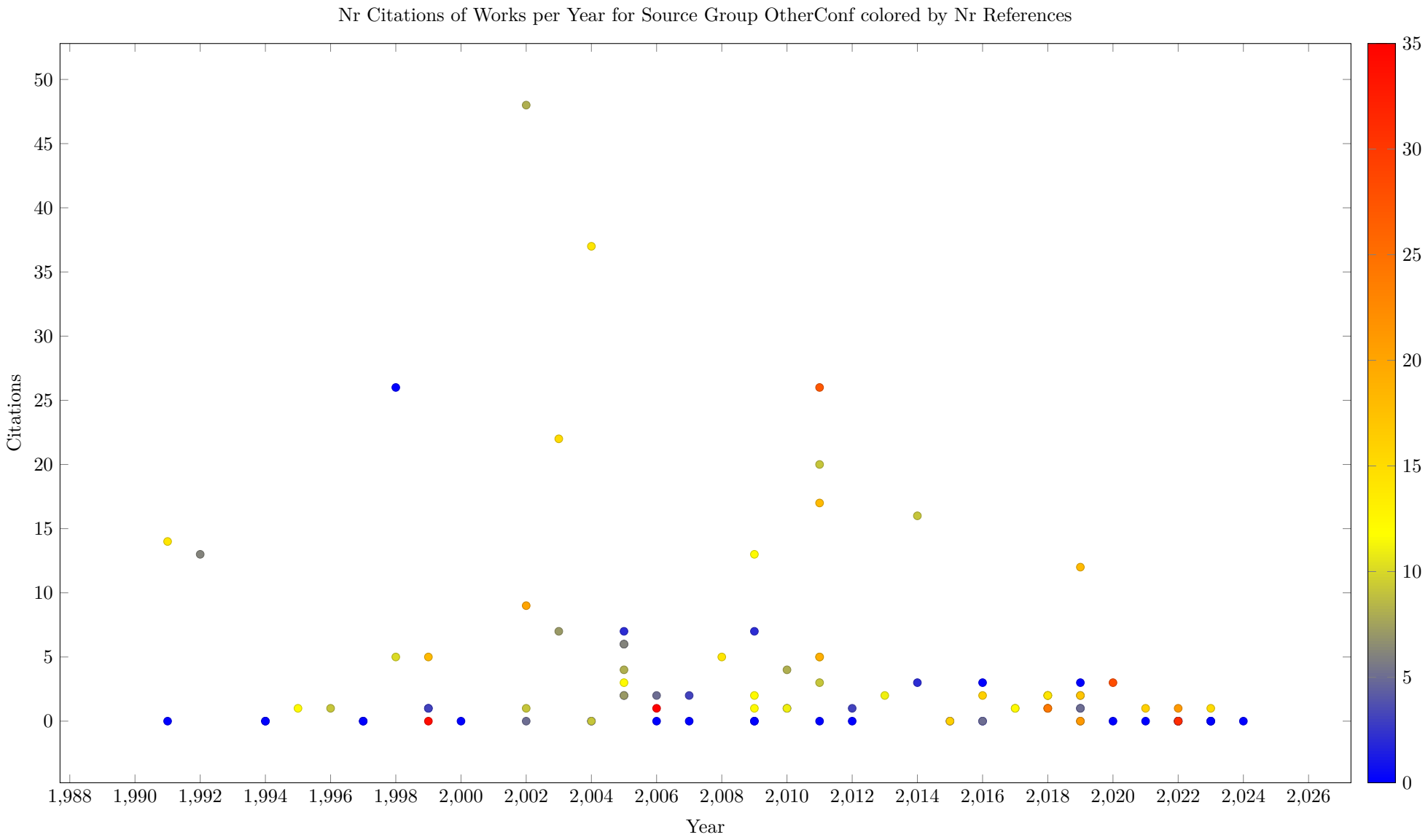

Nr Citations of Works per Year for Source Group CPAIOR colored by Nr References
Citations
0
10
20
30
40
50
60
70
80
2,003
2,004
2,005
2,006
2,007
2,008
2,009
2,010
2,011
2,012
2,013
2,014
2,015
2,016
2,017
2,018
2,019
2,020
2,021
2,022
2,023
2,024
Year
0
5
10
15
20
25
30
35

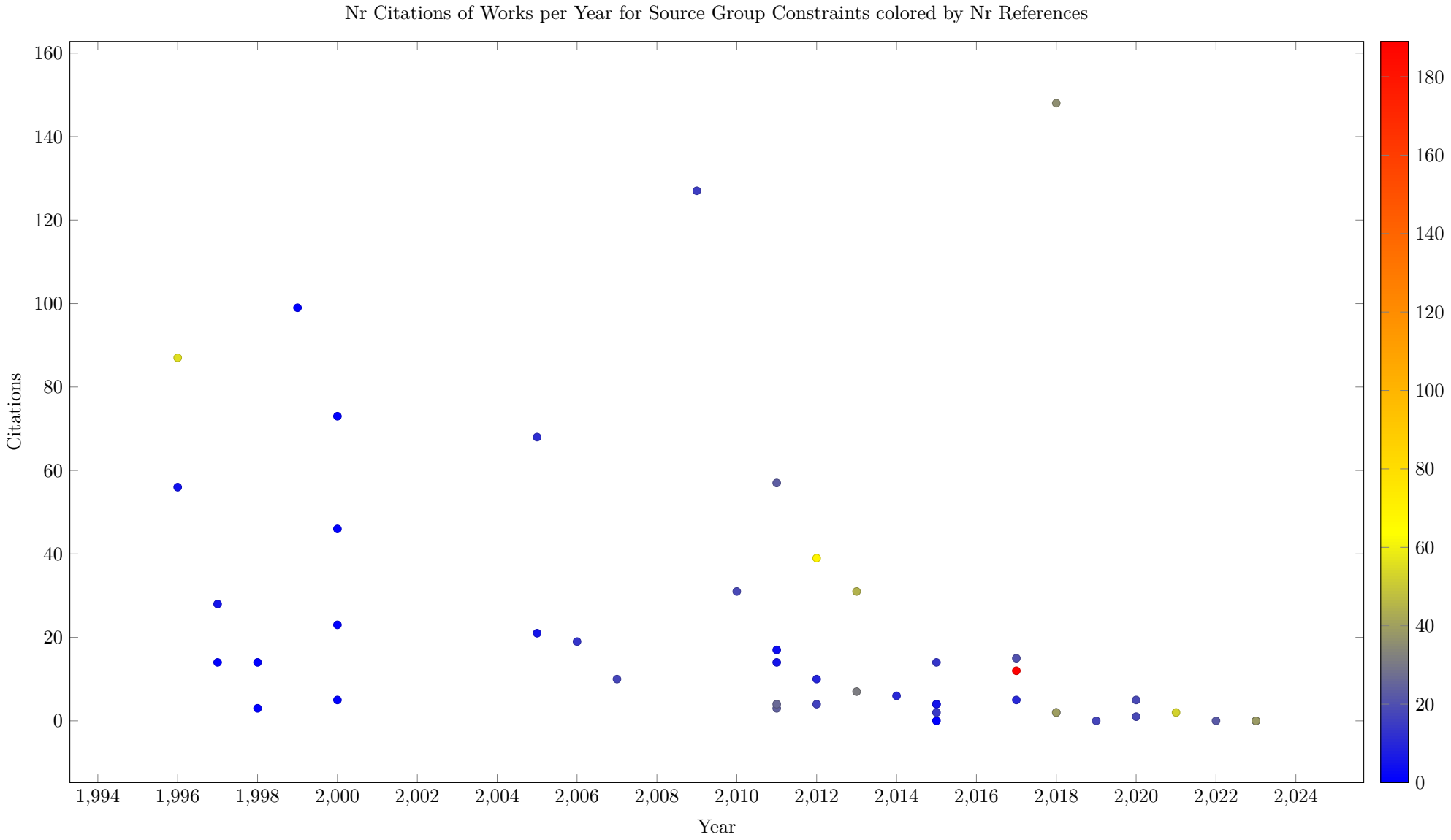

Nr Citations of Works per Year for Source Group ICAPS colored by Nr References
Citations
0
1
2
3
4
5
6
7
8
9
Year
2,001 2,002 2,003 2,004 2,005 2,006 2,007 2,008 2,009 2,010 2,011 2,012 2,013 2,014 2,015 2,016 2,017 2,018 2,019 2,020 2,021 2,022 2,023 2,024 2,025
0 1 2 3 4 5 6 7 8 9 10 11 12 13

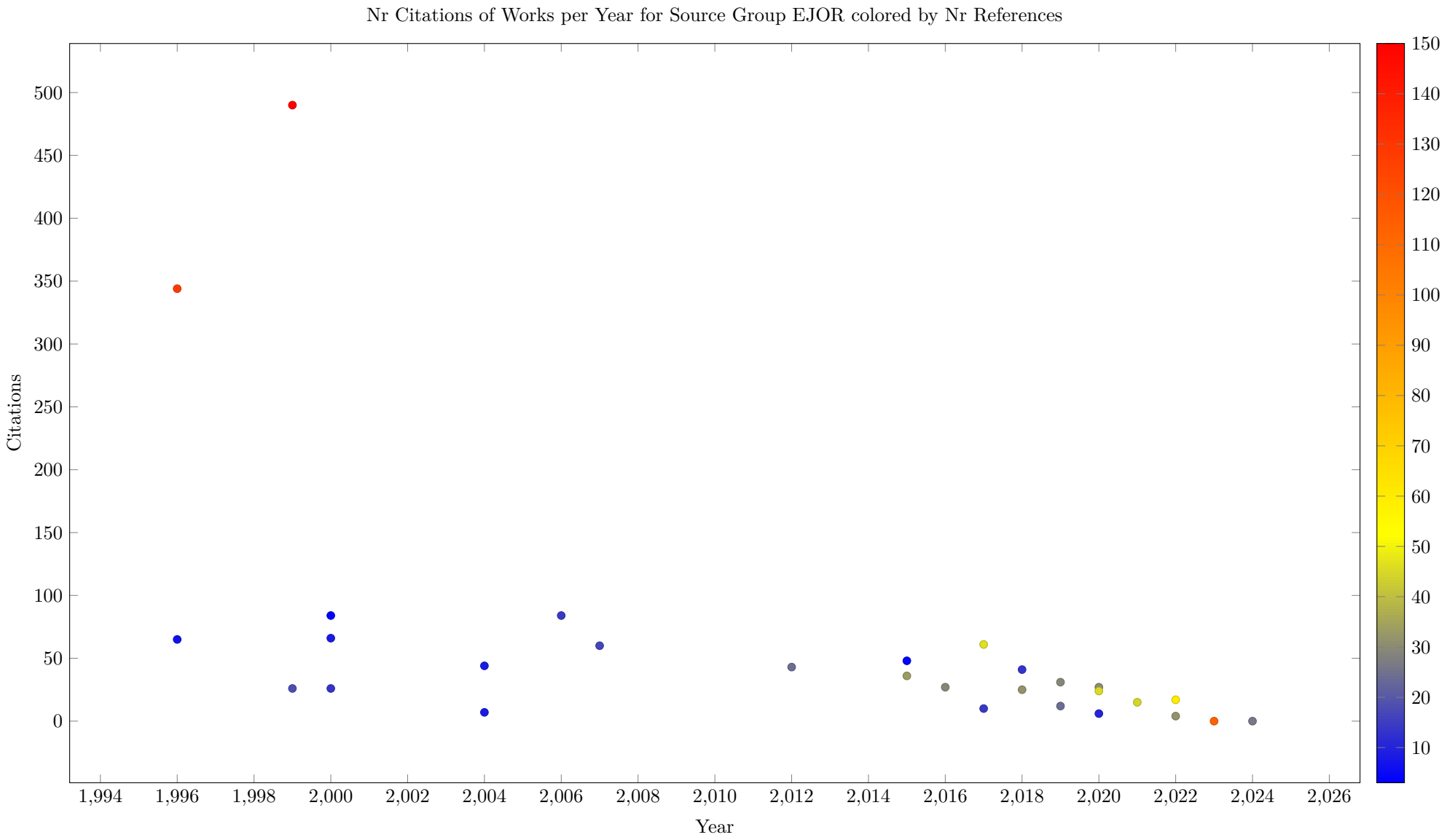

Nr Citations of Works per Year for Source Group AAAI colored by Nr References
Citations
0
0.5
1
1.5
2
2.5
3
3.5
4
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
1
0.8
0.6
0.4
0.2
0
−0.2

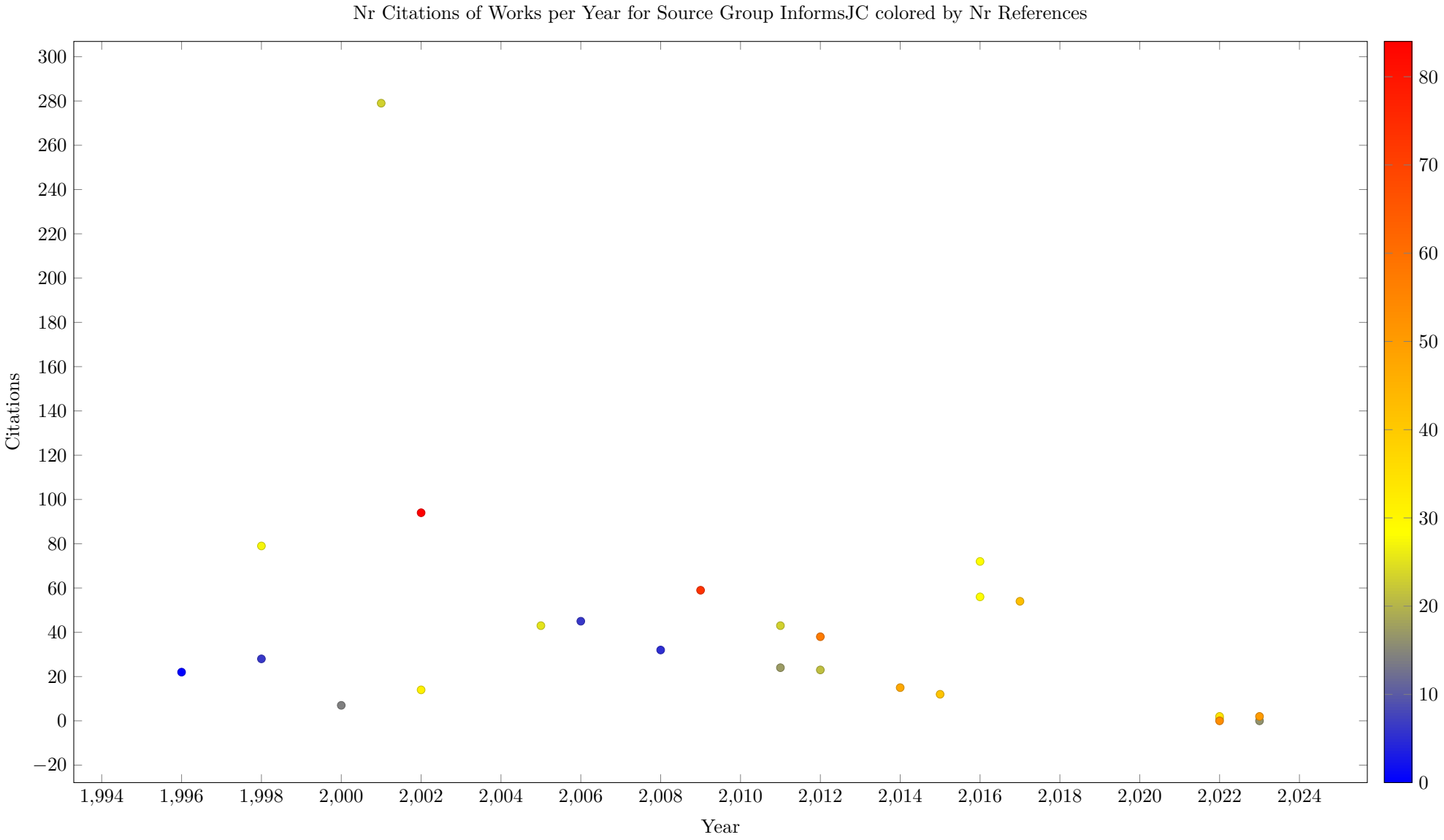

Nr Citations of Works per Year for Source Group IJCAI colored by Nr References
Citations
Year
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
−0.5
1,986
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
2,026
1
0.8
0.6
0.4
0.2
0
−0.

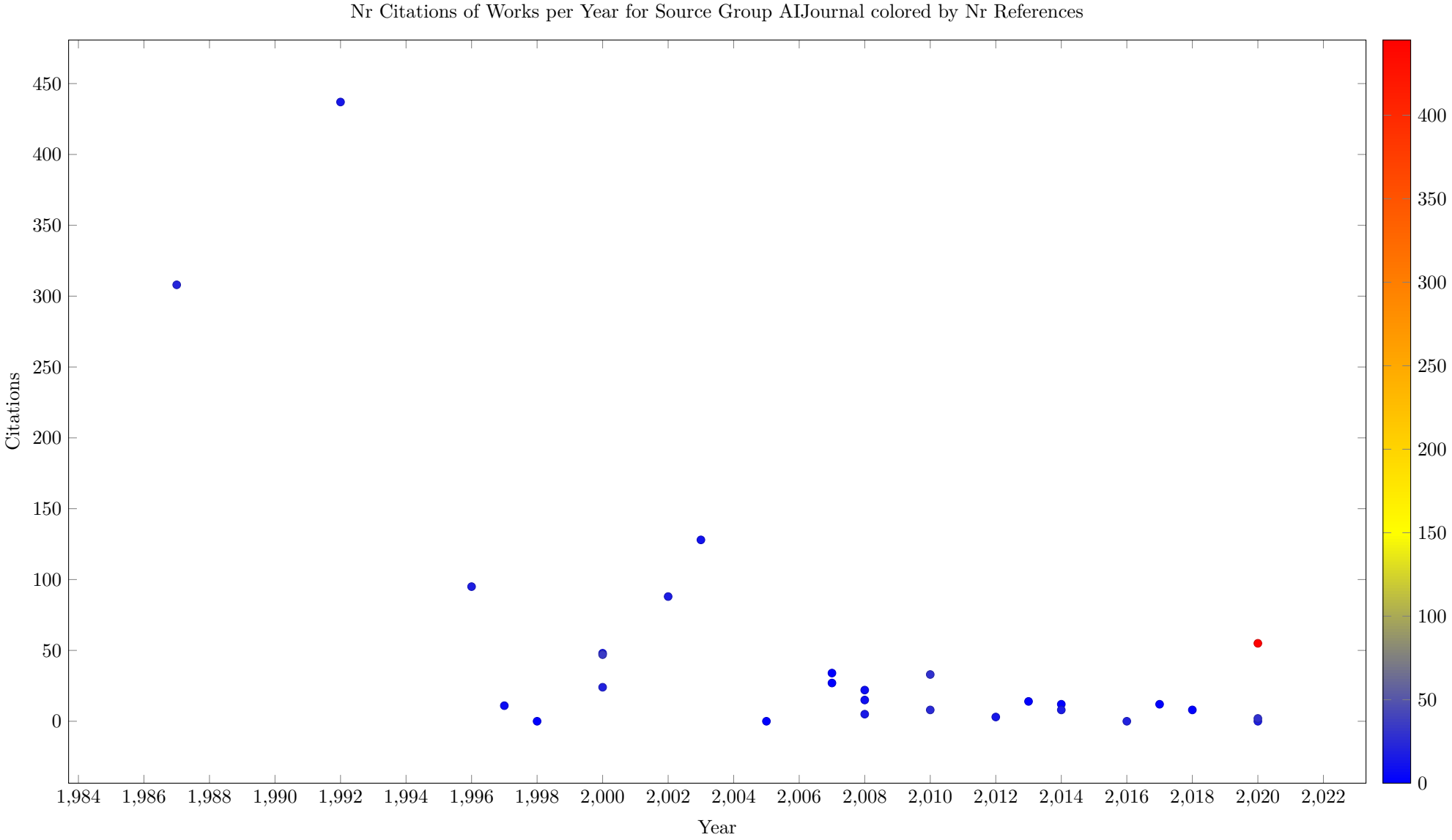

Nr Citations of Works per Year for Source Group ECAI colored by Nr References
Citations
1
0.8
0.6
0.4
0.2
0
−0.2
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
2,026
Year

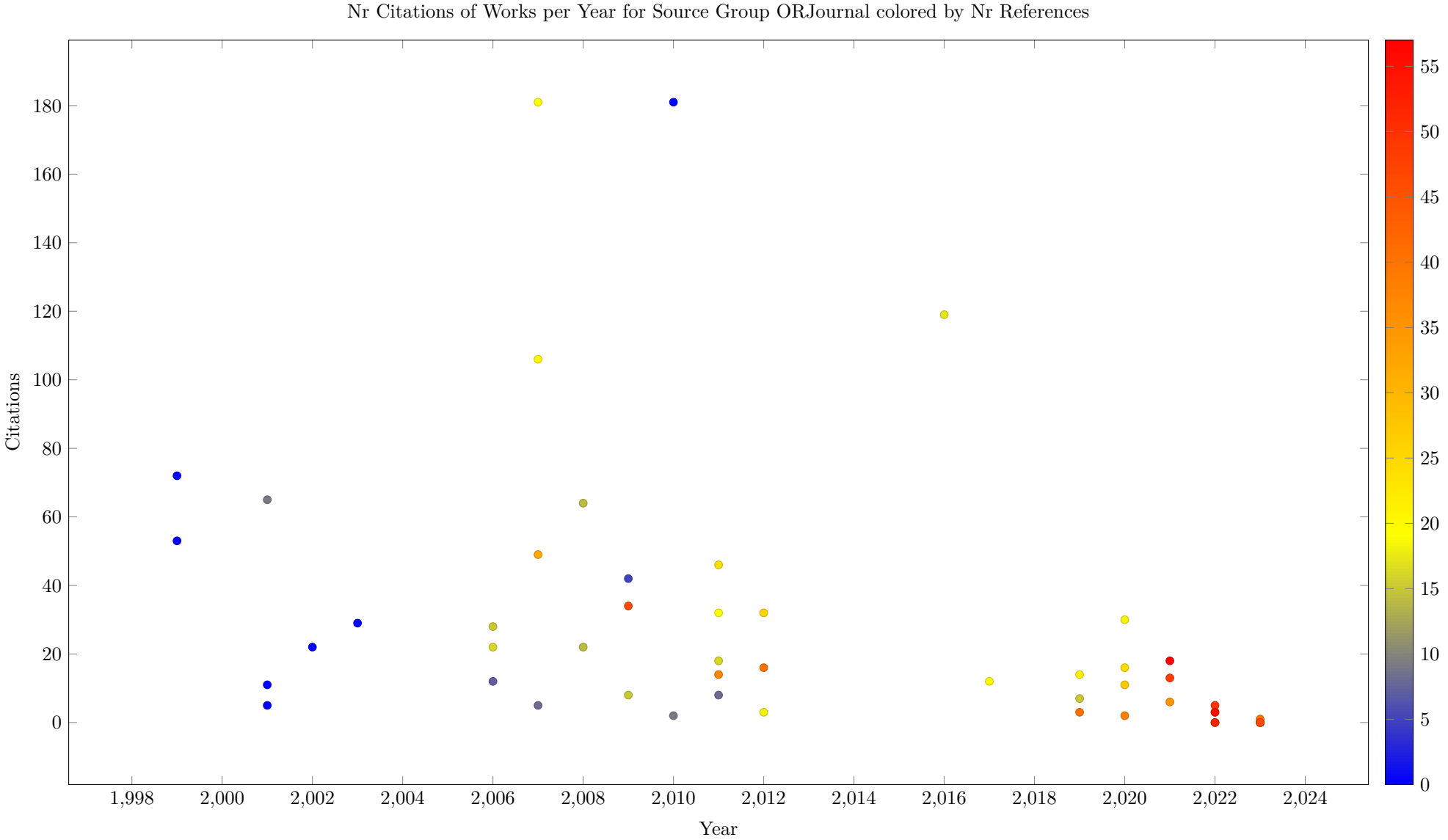

Nr Citations of Works per Year for Source Group OtherConf colored by Nr References
Citations
Year
0
5
10
15
20
25
30
35
40
45
50
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
2,026

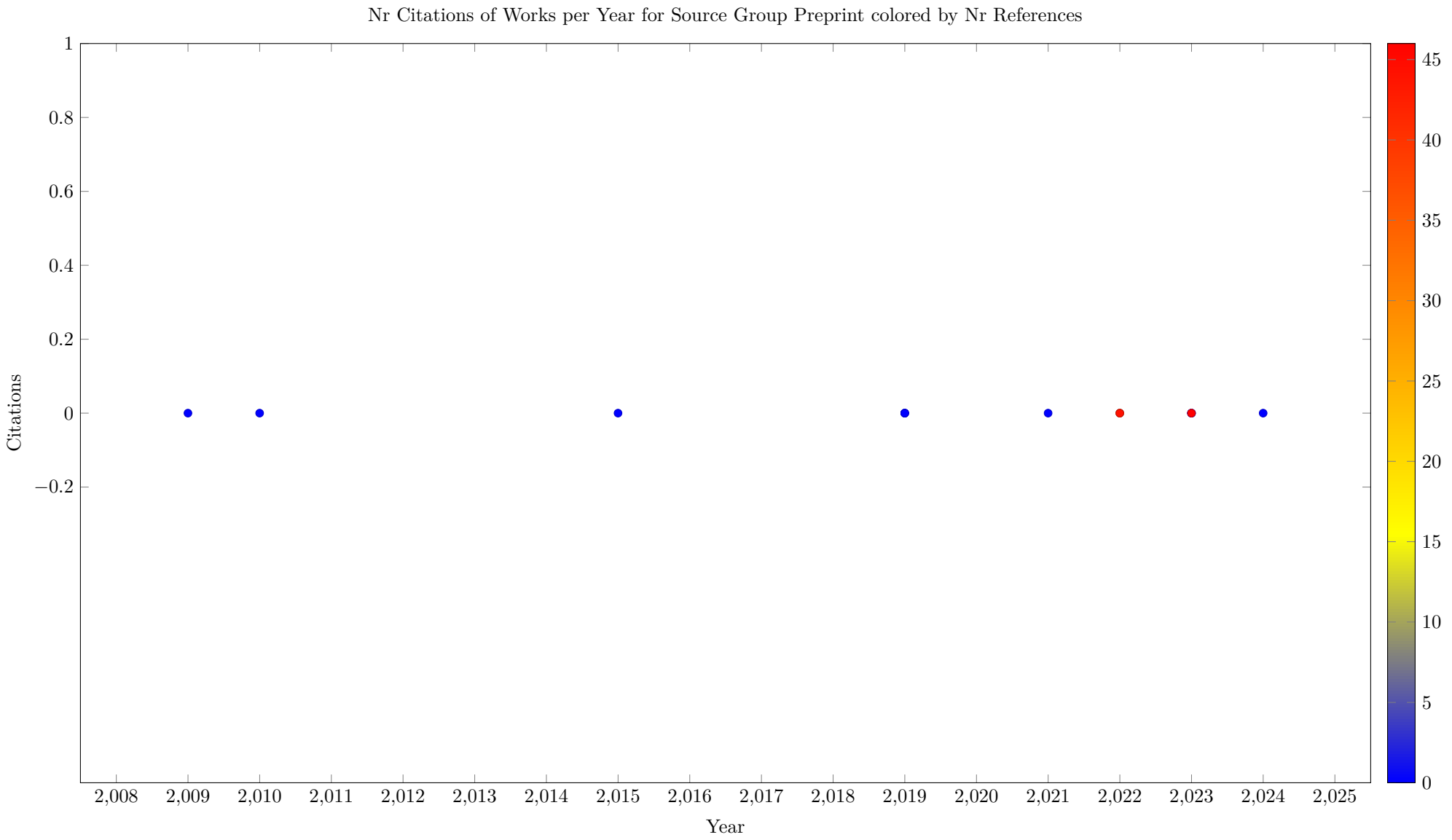

Nr Citations of Works per Year for Source Group Constraints colored by Nr References
Citations
Year
0
20
40
60
80
100
120
140
160
180
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024

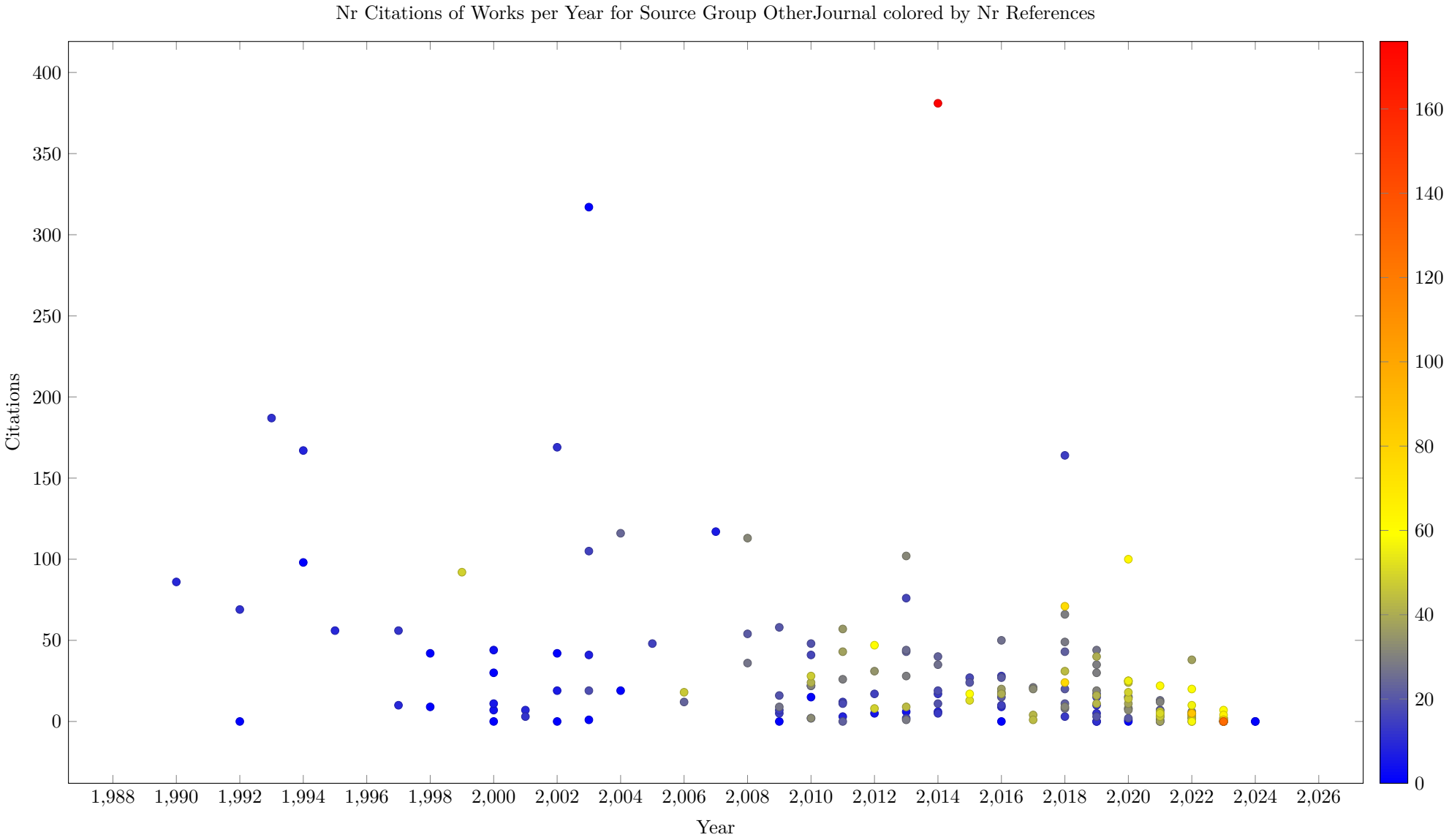

Nr Citations of Works per Year for Source Group EJOR colored by Nr References
Citations
0
50
100
150
200
250
300
350
400
450
500
Year
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
2,026
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150

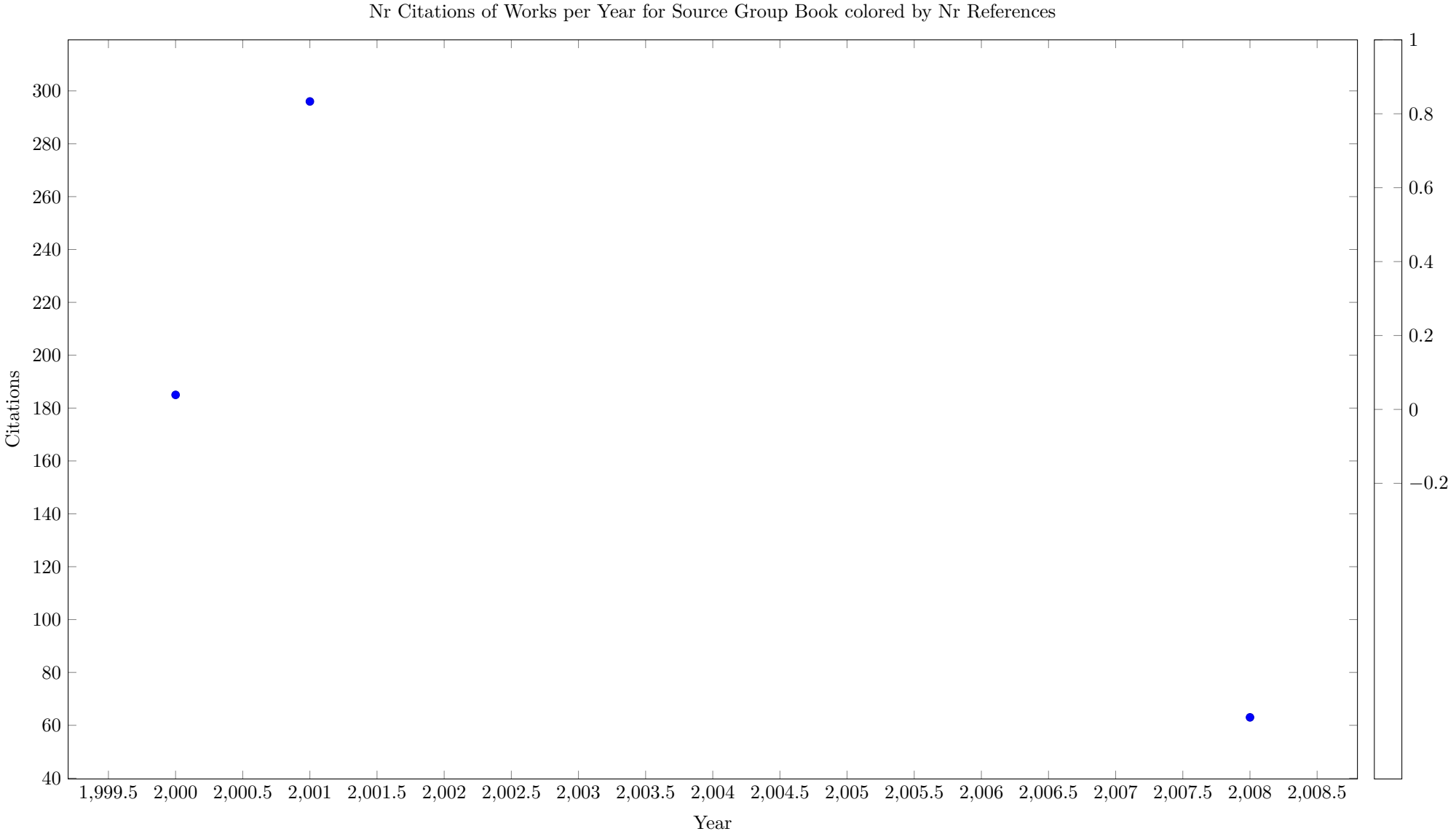

Nr Citations of Works per Year for Source Group InformsJC colored by Nr References
Citations
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
−20
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
Year
80
70
60
50
40
30
20
10
0


Nr Citations of Works per Year for Source Group AIJournal colored by Nr References
Citations
Year
0
50
100
150
200
250
300
350
400
450
1,984
1,986
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022

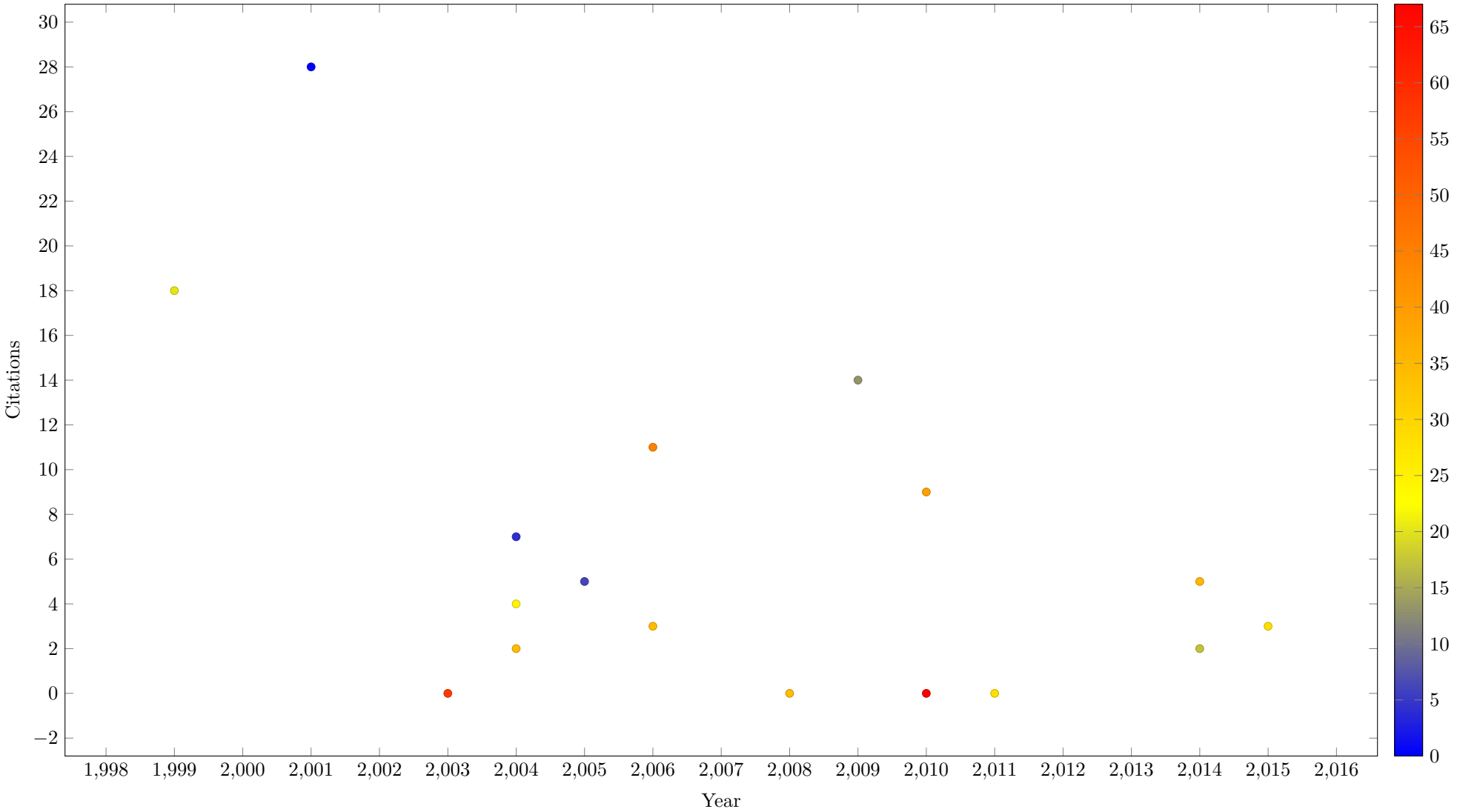

Nr Citations of Works per Year for Source Group ORJournal colored by Nr References
Citations
0
20
40
60
80
100
120
140
160
180
Year
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
0
5
10
15
20
25
30
35
40
45
50
55

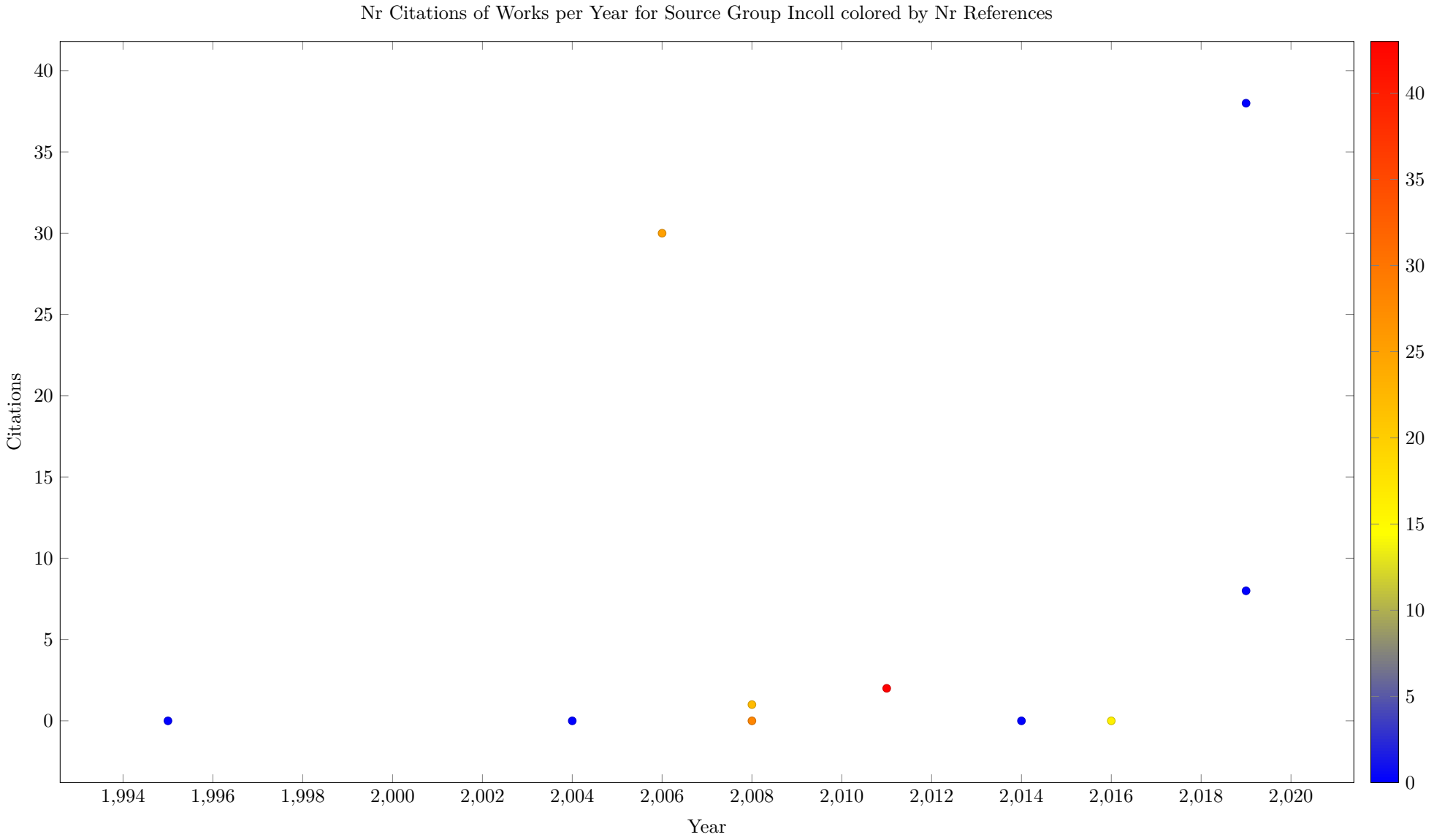

Nr Citations of Works per Year for Source Group Preprint colored by Nr References
Citations
1
0.8
0.6
0.4
0.2
0
−0.2
2,008
2,009
2,010
2,011
2,012
2,013
2,014
2,015
2,016
2,017
2,018
2,019
2,020
2,021
2,022
2,023
2,024
2,025
Year
45
40
35
30
25
20
15
10
5
0

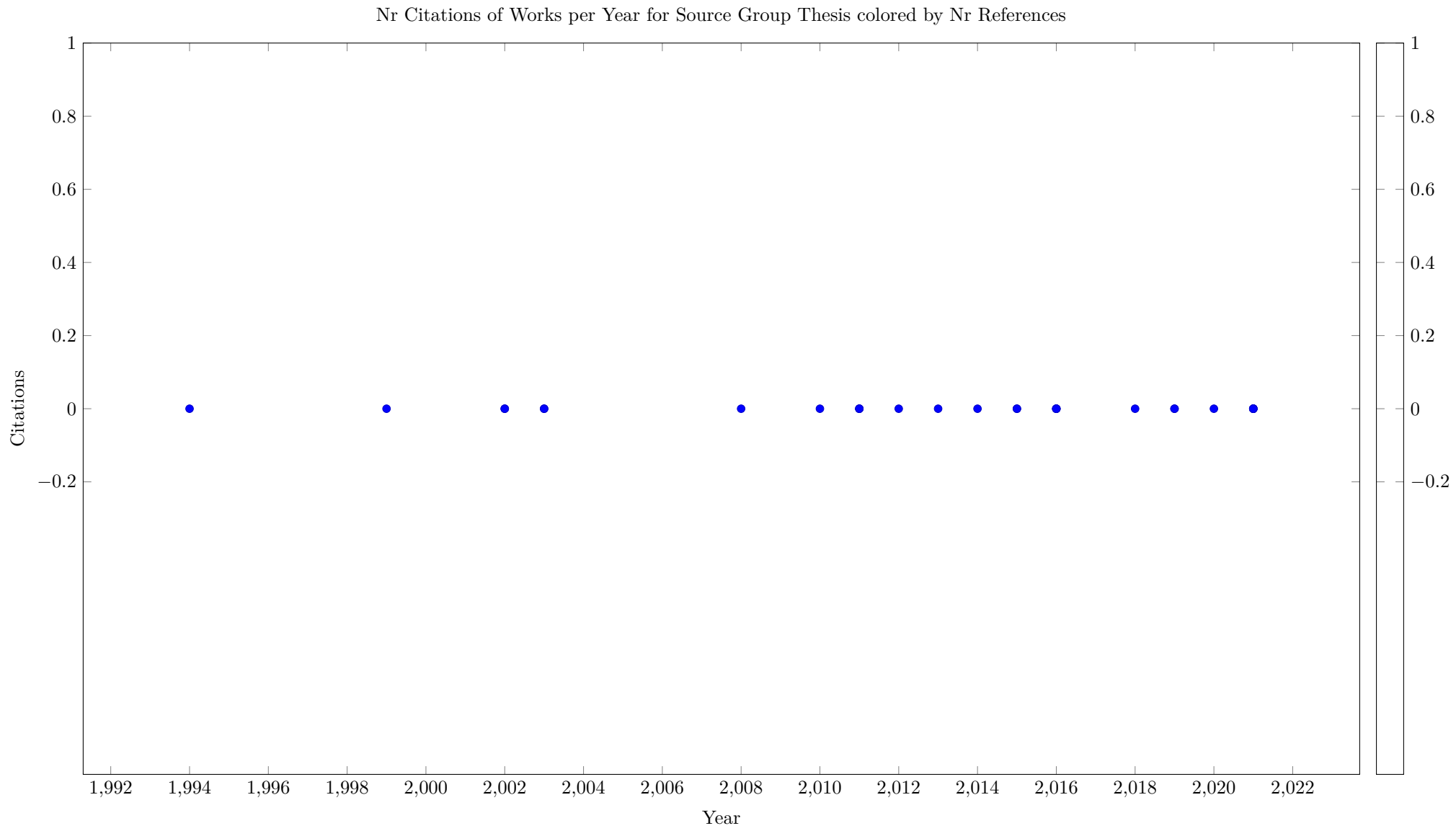

Nr Citations of Works per Year for Source Group OtherJournal colored by Nr References
Citations
400
350
300
250
200
150
100
50
0
1,988
1,990
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
2,024
2,026
Year
160
140
120
100
80
60
40
20
0


Nr Citations of Works per Year for Source Group Book colored by Nr References
Citations
300
280
260
240
220
200
180
160
140
120
100
80
60
40
1,999.5
2,000
2,000.5
2,001
2,001.5
2,002
2,002.5
2,003
2,003.5
2,004
2,004.5
2,005
2,005.5
2,006
2,006.5
2,007
2,007.5
2,008
2,008.5
Year
1
0.8
0.6
0.4
0.2
0
−0.2

Nr Citations of Works per Year for Source Group Inbook colored by Nr References




Nr Citations of Works per Year for Source Group Incoll colored by Nr References
Citations
Year
0
5
10
15
20
25
30
35
40
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020


Nr Citations of Works per Year for Source Group Thesis colored by Nr References
Citations
1
0.8
0.6
0.4
0.2
0
−0.2
1,992
1,994
1,996
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022
Year

## 15.2 Reference Flows

The following table looks at references between source groups that are contained in the survey, i.e. where bot the citing and the cited work is included in the survey. We show how many papers referred to in the group on the left belong to the group in the column.

Table 12: Reference Flows

| | Background | CP | CPAIOR | ICAPS | AAAI | IJCAI | OtherConf | Constraints | EJOR | InformsJC | AIJournal | ORJournal | OtherJournal | Book | Inbook | Incoll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Background | 68 | 15 | 3 | | | | 1 | 12 | 7 | 20 | 2 | 10 | 22 | 6 | 3 | |
| CP | 127 | 125 | 70 | 2 | 1 | 1 | 10 | 41 | 6 | 26 | 22 | 14 | 73 | 27 | 2 | 4 |
| CPAIOR | 96 | 111 | 66 | 1 | 1 | 1 | 16 | 47 | 15 | 25 | 10 | 23 | 66 | 27 | 4 | 2 |
| ICAPS | 4 | 3 | | | | | | | | | | | | | | |
| OtherConf | 44 | 36 | 18 | | | | 7 | 18 | 6 | 11 | 8 | 11 | 47 | 10 | 3 | |
| Constraints | 63 | 58 | 43 | 1 | | | 7 | 24 | 5 | 14 | 10 | 13 | 55 | 18 | 2 | 1 |
| EJOR | 55 | 3 | 1 | | | | | 10 | 21 | 19 | 4 | 18 | 38 | | 2 | 1 |
| InformsJC | 63 | 21 | 11 | | | | | 19 | 17 | 26 | 7 | 15 | 34 | 15 | 1 | 1 |
| AIJournal | 32 | 9 | 4 | 1 | | | 7 | 3 | 9 | 5 | 16 | 4 | 33 | 1 | 1 | |
| ORJournal | 78 | 36 | 17 | | | | 1 | 31 | 23 | 32 | 15 | 19 | 80 | 8 | 2 | 1 |
| Preprint | 4 | | | | | | | 3 | 11 | 4 | | 4 | 8 | 1 | | |
| OtherJournal | 181 | 67 | 44 | | | | 11 | 89 | 70 | 73 | 46 | 84 | 347 | 25 | 4 | 4 |
| Inbook | 68 | 16 | 10 | | | | 2 | 14 | 8 | 20 | 3 | 16 | 38 | 9 | 4 | |
| Incoll | 12 | 2 | | | | | 2 | 3 | 5 | 1 | 5 | 5 | 4 | 2 | 1 | |

The entries in the previous table are not directly comparable, without knowing how many works are in group. The next table presents a normalized view, where we divide the flow count by the product of the group sizes. This produces a likelihood of a paper in the source group citing a paper in the target group, given as a percentage from 0 to 100. We can see that the likelihood does not depend on the prestige of the target, e.g. papers at AAAI are cited much less than papers in CP.

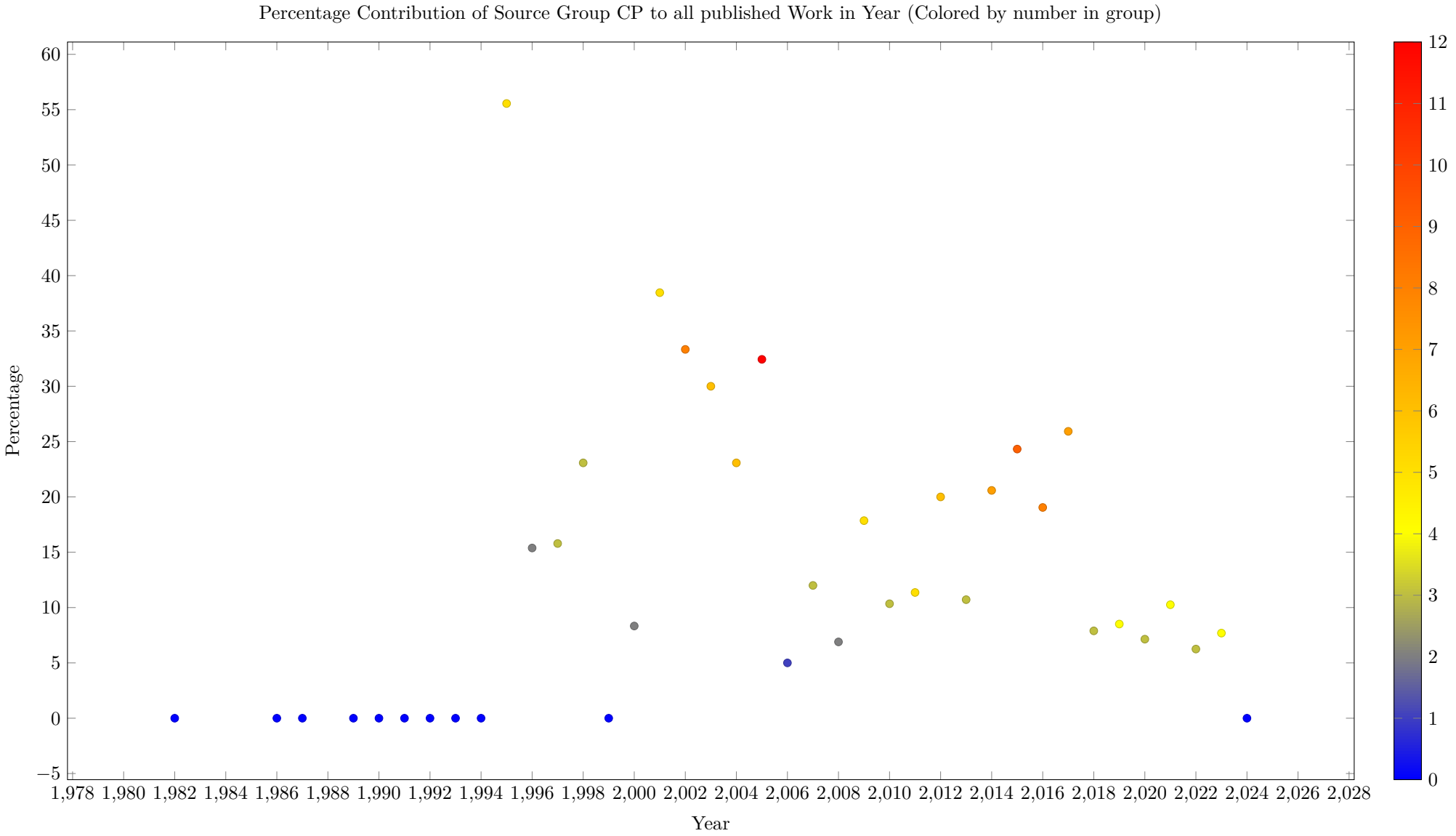
Note that the numbers are derived from the flows contained in the survey, which are based on the OpenCitation reference links. If such links are missing, or we are missing works in some group, then the results will be affected.

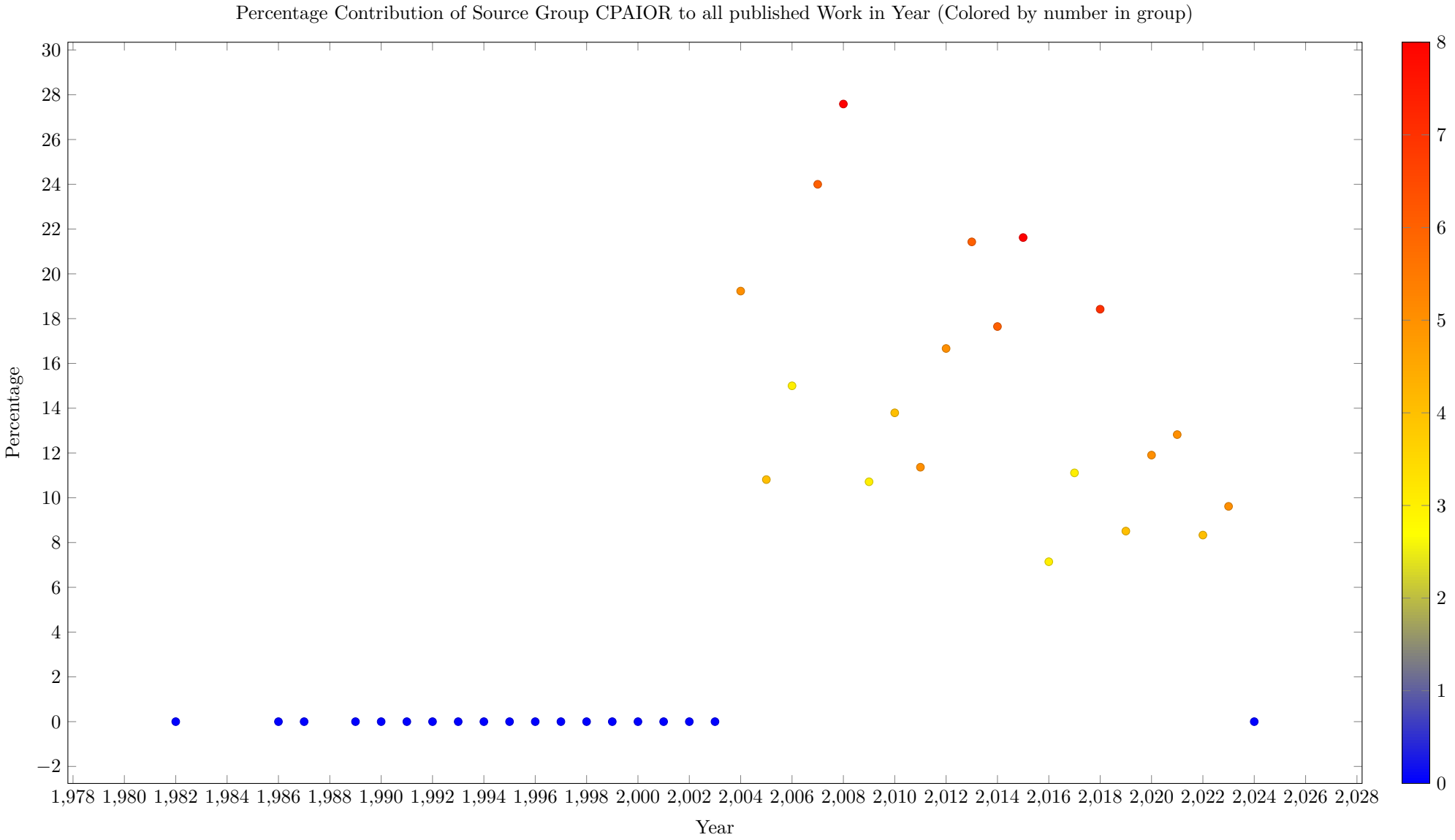
Table 13: Reference Flows Normalized

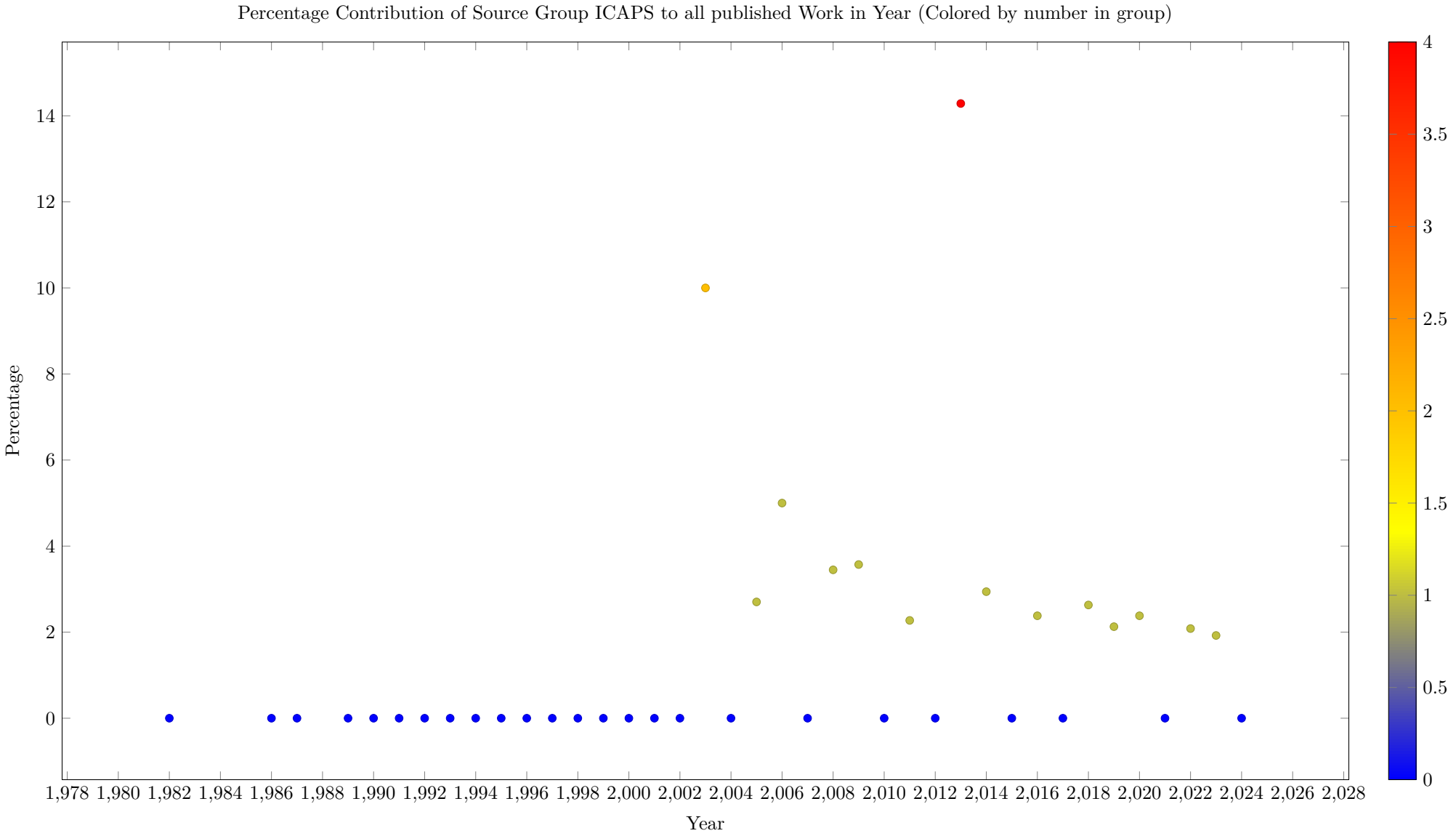
| | Background | CP | CPAIOR | ICAPS | AAAI | IJCAI | OtherConf | Constraints | EJOR | InformsJC | AIJournal | ORJournal | OtherJournal | Book | Inbook | Incoll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Background | 3.85 | 0.27 | 0.07 | | | | 0.02 | 0.61 | 0.57 | 1.90 | 0.17 | 0.44 | 0.27 | 4.76 | 0.42 | |
| CP | 2.29 | 0.72 | 0.54 | 0.08 | 0.01 | 0.03 | 0.08 | 0.66 | 0.16 | 0.79 | 0.60 | 0.20 | 0.29 | 6.82 | 0.09 | 0.30 |
| CPAIOR | 2.31 | 0.85 | 0.67 | 0.06 | 0.02 | 0.03 | 0.16 | 1.01 | 0.52 | 1.01 | 0.36 | 0.43 | 0.35 | 9.09 | 0.24 | 0.20 |
| ICAPS | 0.53 | 0.13 | | | | | | | | | | | | | | |
| OtherConf | 1.07 | 0.28 | 0.19 | | | | 0.07 | 0.39 | 0.21 | 0.45 | 0.29 | 0.21 | 0.25 | 3.40 | 0.18 | |
| Constraints | 3.19 | 0.93 | 0.92 | 0.12 | | | 0.15 | 1.09 | 0.37 | 1.19 | 0.76 | 0.51 | 0.61 | 12.77 | 0.25 | 0.21 |
| EJOR | 4.52 | 0.08 | 0.03 | | | | | 0.73 | 2.50 | 2.62 | 0.49 | 1.15 | 0.68 | | 0.41 | 0.34 |
| InformsJC | 6.00 | 0.64 | 0.44 | | | | | 1.62 | 2.34 | 4.16 | 1.00 | 1.11 | 0.71 | 20.00 | 0.24 | 0.40 |
| AIJournal | 2.72 | 0.24 | 0.14 | 0.20 | | | 0.26 | 0.23 | 1.11 | 0.71 | 2.04 | 0.26 | 0.61 | 1.19 | 0.21 | |
| ORJournal | 3.44 | 0.51 | 0.32 | | | | 0.02 | 1.22 | 1.47 | 2.37 | 0.99 | 0.65 | 0.77 | 4.94 | 0.22 | 0.19 |
| Preprint | 0.60 | | | | | | | 0.40 | 2.37 | 1.00 | | 0.46 | 0.26 | 2.08 | | |
| OtherJournal | 2.24 | 0.26 | 0.23 | | | | 0.06 | 0.99 | 1.26 | 1.52 | 0.86 | 0.81 | 0.94 | 4.34 | 0.12 | 0.21 |
| Inbook | 9.52 | 0.71 | 0.59 | | | | 0.12 | 1.75 | 1.62 | 4.71 | 0.63 | 1.74 | 1.16 | 17.65 | 1.38 | |
| Incoll | 2.86 | 0.15 | | | | | 0.20 | 0.64 | 1.72 | 0.40 | 1.79 | 0.93 | 0.21 | 6.67 | 0.59 | |

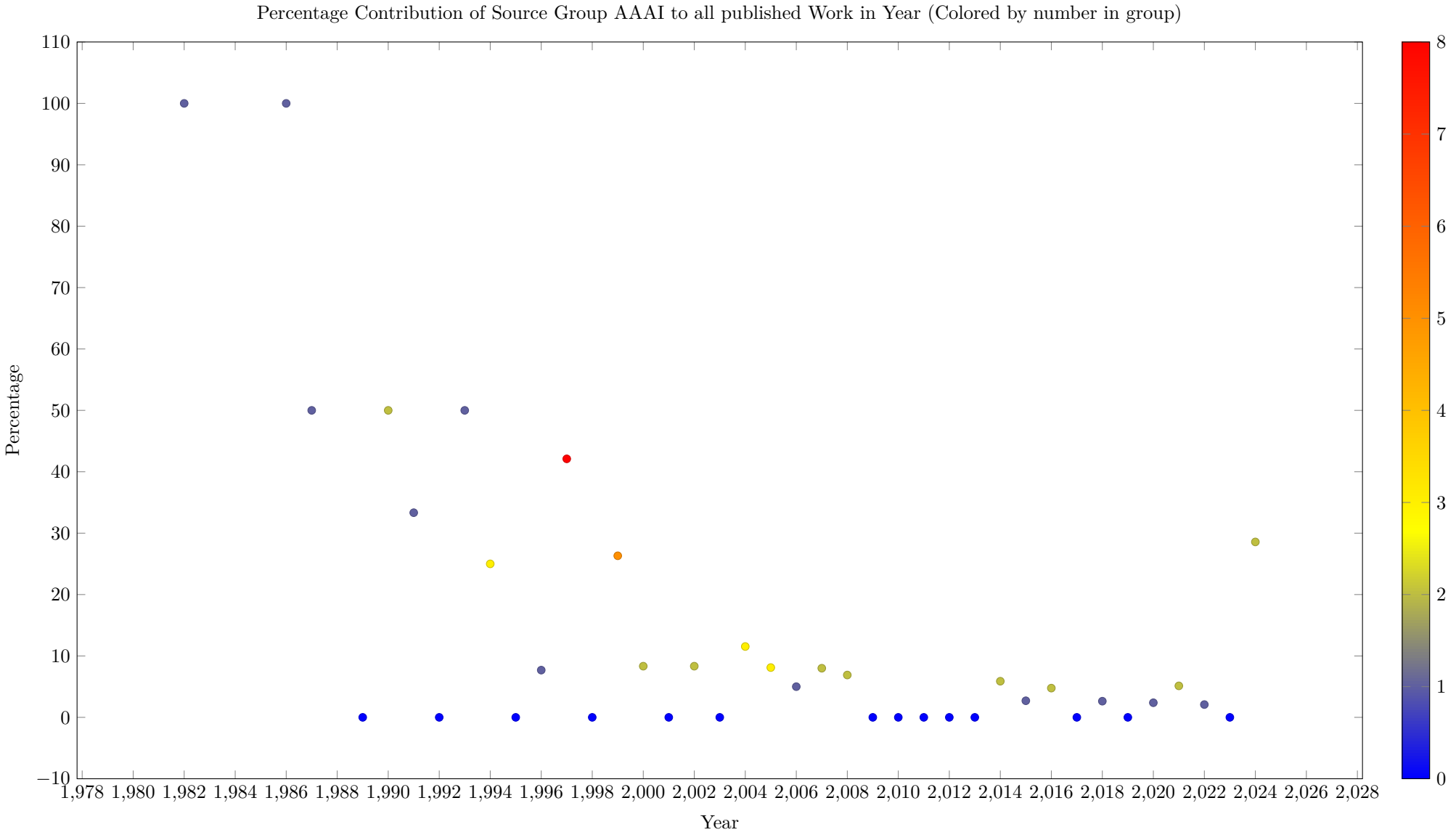
# 16 Contribution of Source Group to Total Works per Year

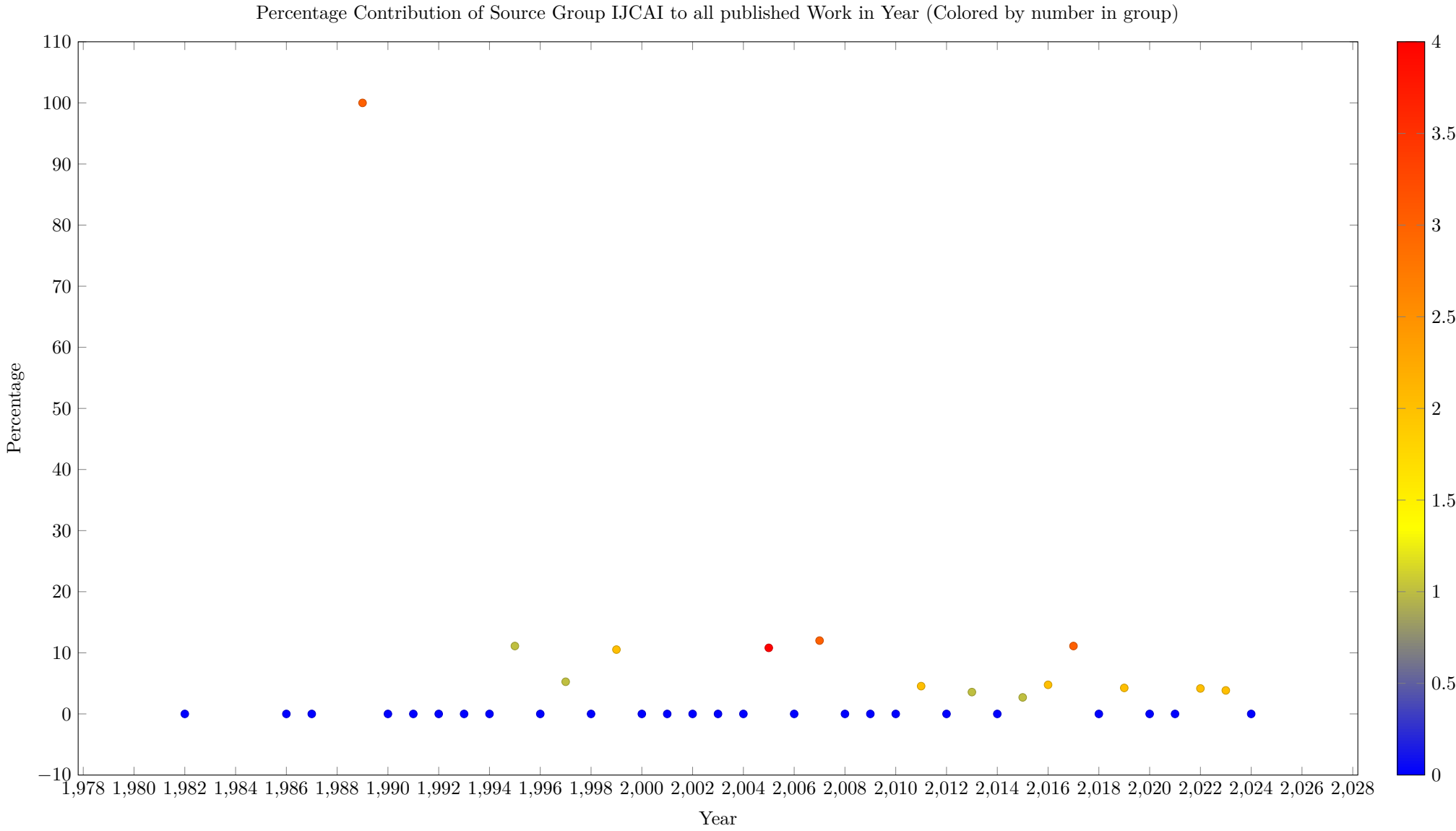
The following plots show the percentage of works published in a year belonging to a specific source group. This plot helps to understand how important that group is to the field over time

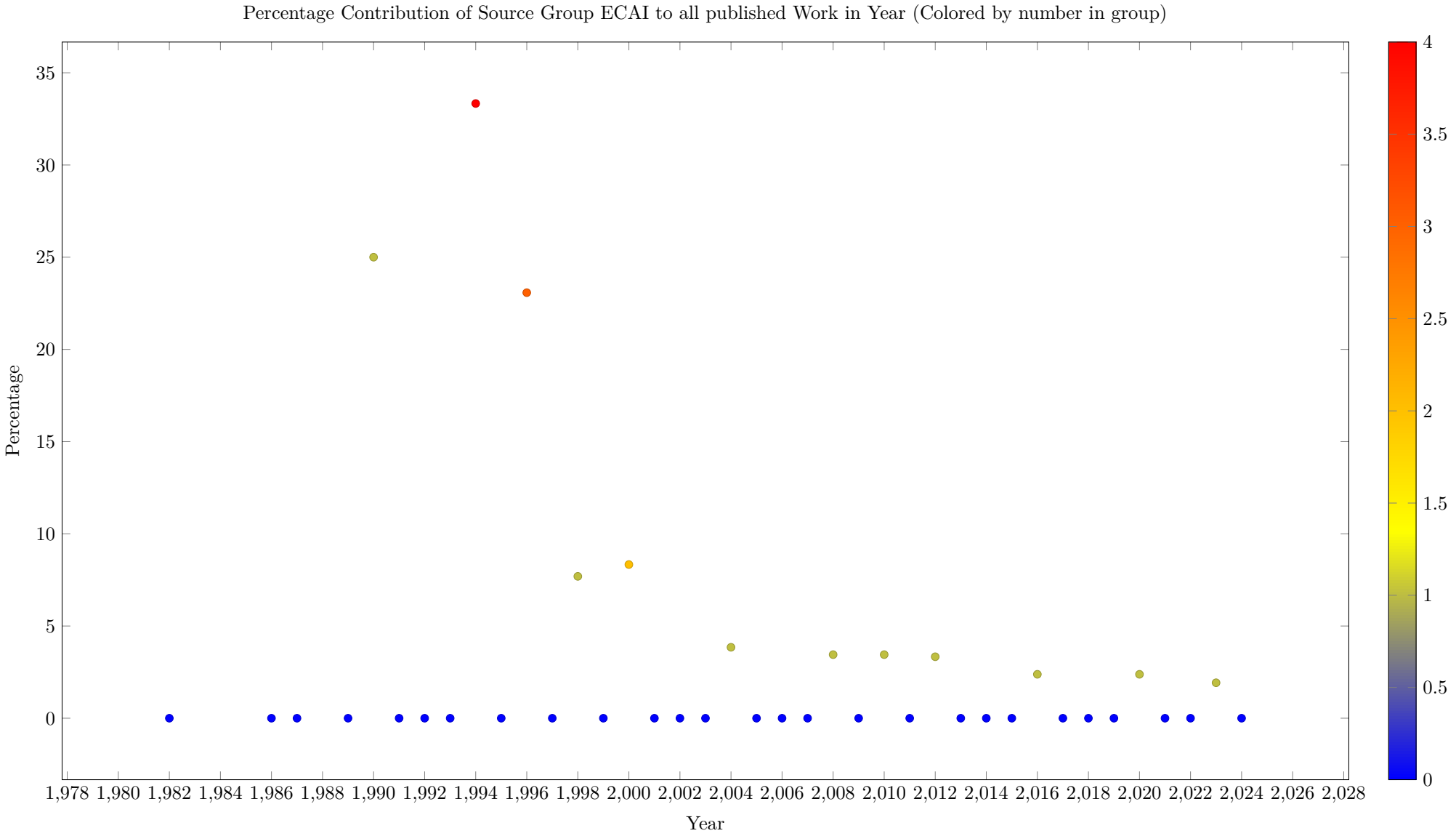

Percentage Contribution of Source Group CP to all published Work in Year (Colored by number in group)
Percentage
60
55
50
45
40
35
30
25
20
15
10
5
0
−5
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
12
11
10
9
8
7
6
5
4
3
2
1
0

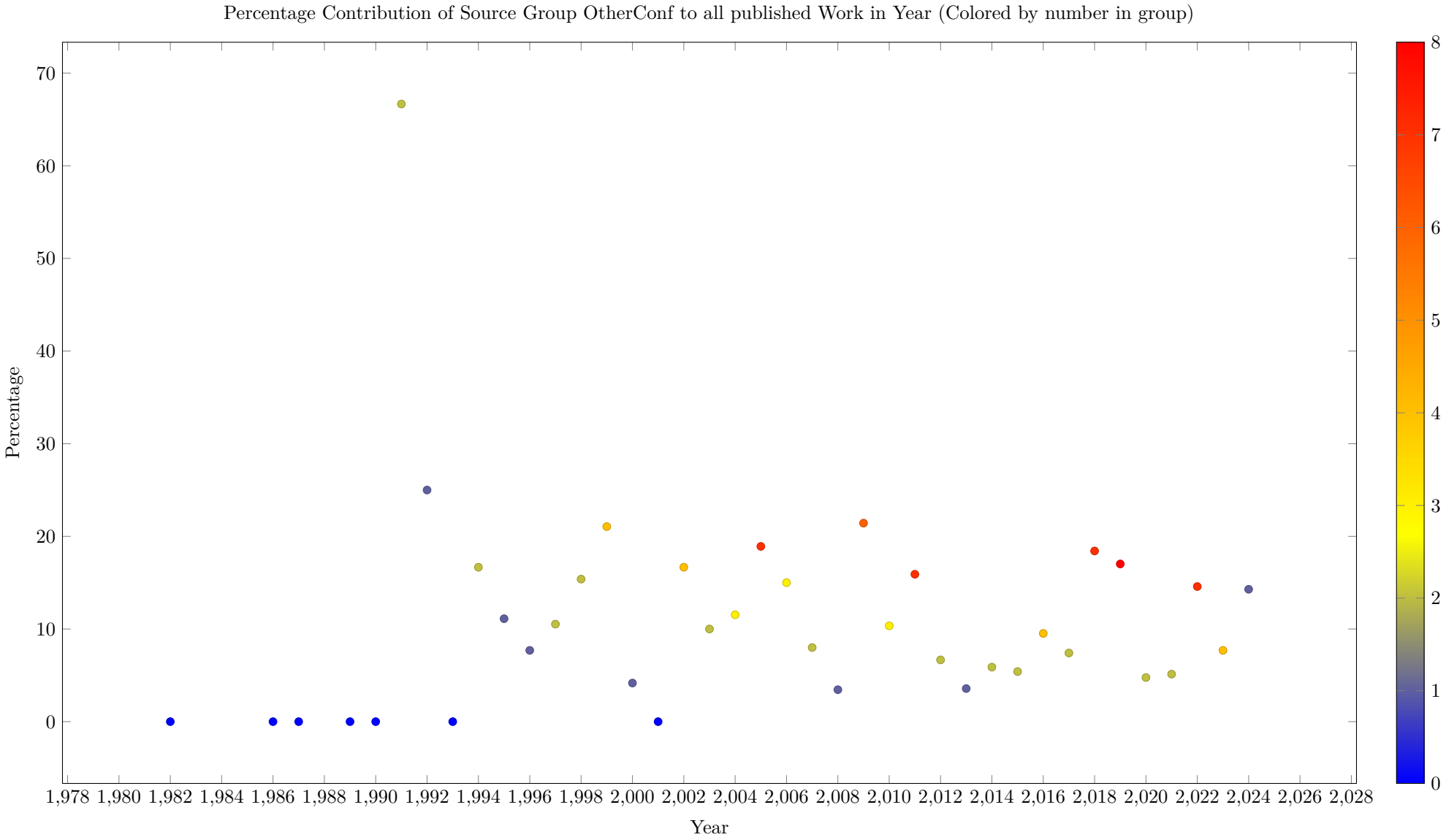

Percentage Contribution of Source Group CPAIOR to all published Work in Year (Colored by number in group)
Percentage
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
−2
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
8
7
6
5
4
3
2
1
0

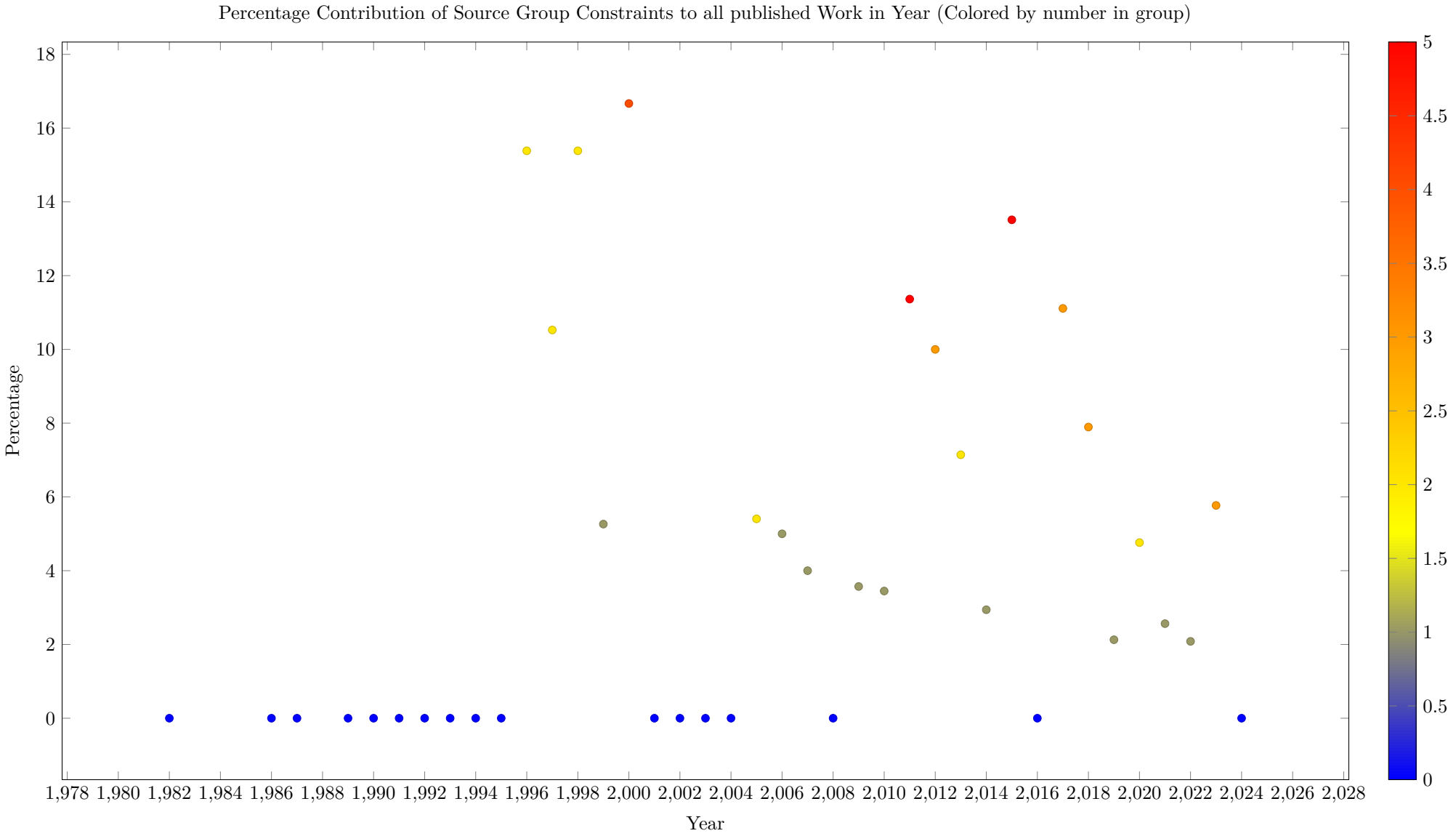

Percentage Contribution of Source Group ICAPS to all published Work in Year (Colored by number in group)
Percentage
0
2
4
6
8
10
12
14
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0
0.5
1
1.5
2
2.5
3
3.5
4

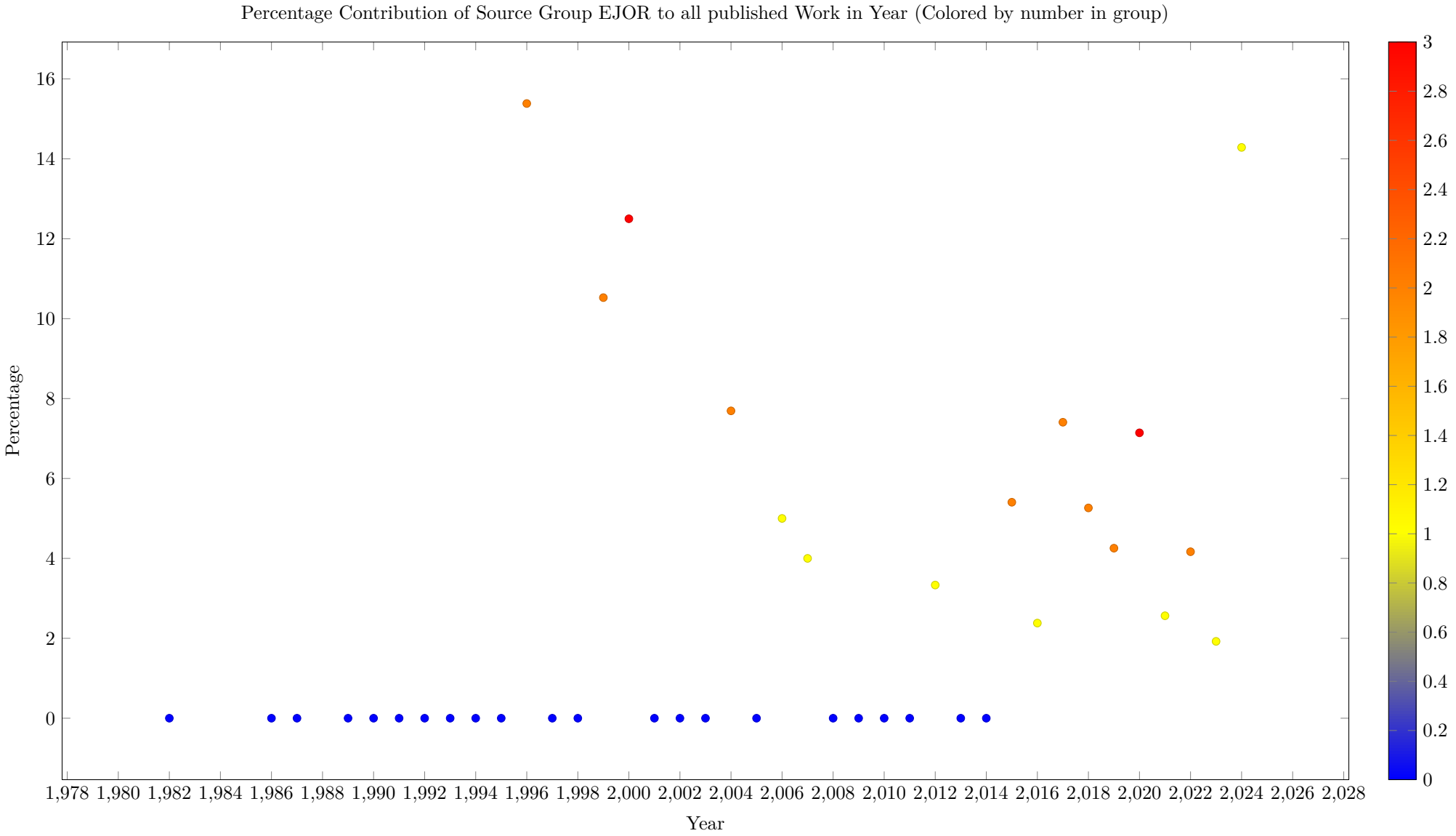

Percentage Contribution of Source Group AAAI to all published Work in Year (Colored by number in group)
Percentage
110
100
90
80
70
60
50
40
30
20
10
0
−10
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
8
7
6
5
4
3
2
1
0

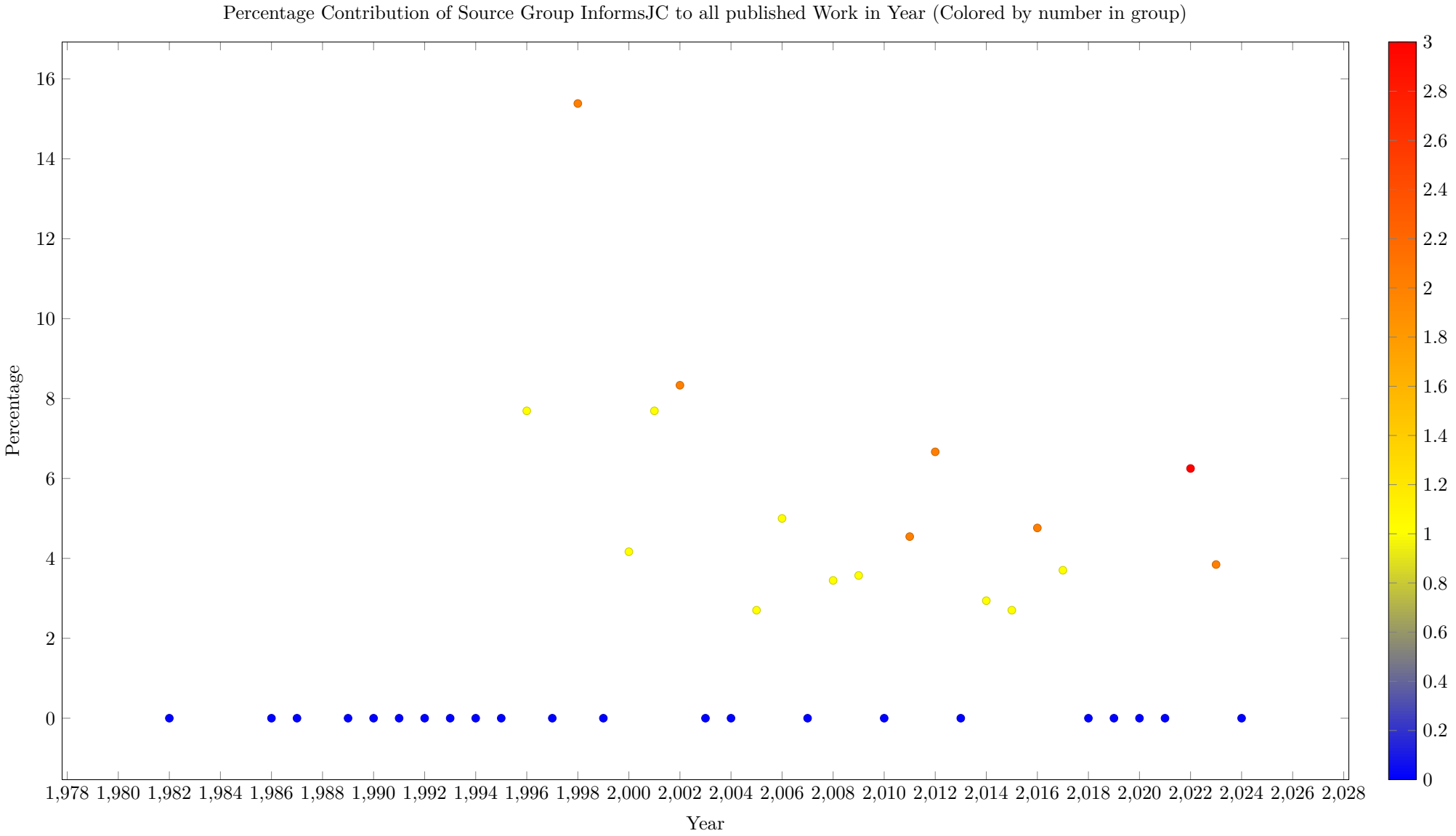

Percentage Contribution of Source Group IJCAI to all published Work in Year (Colored by number in group)
Percentage
110
100
90
80
70
60
50
40
30
20
10
0
−10
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
4
3.5
3
2.5
2
1.5
1
0.5
0

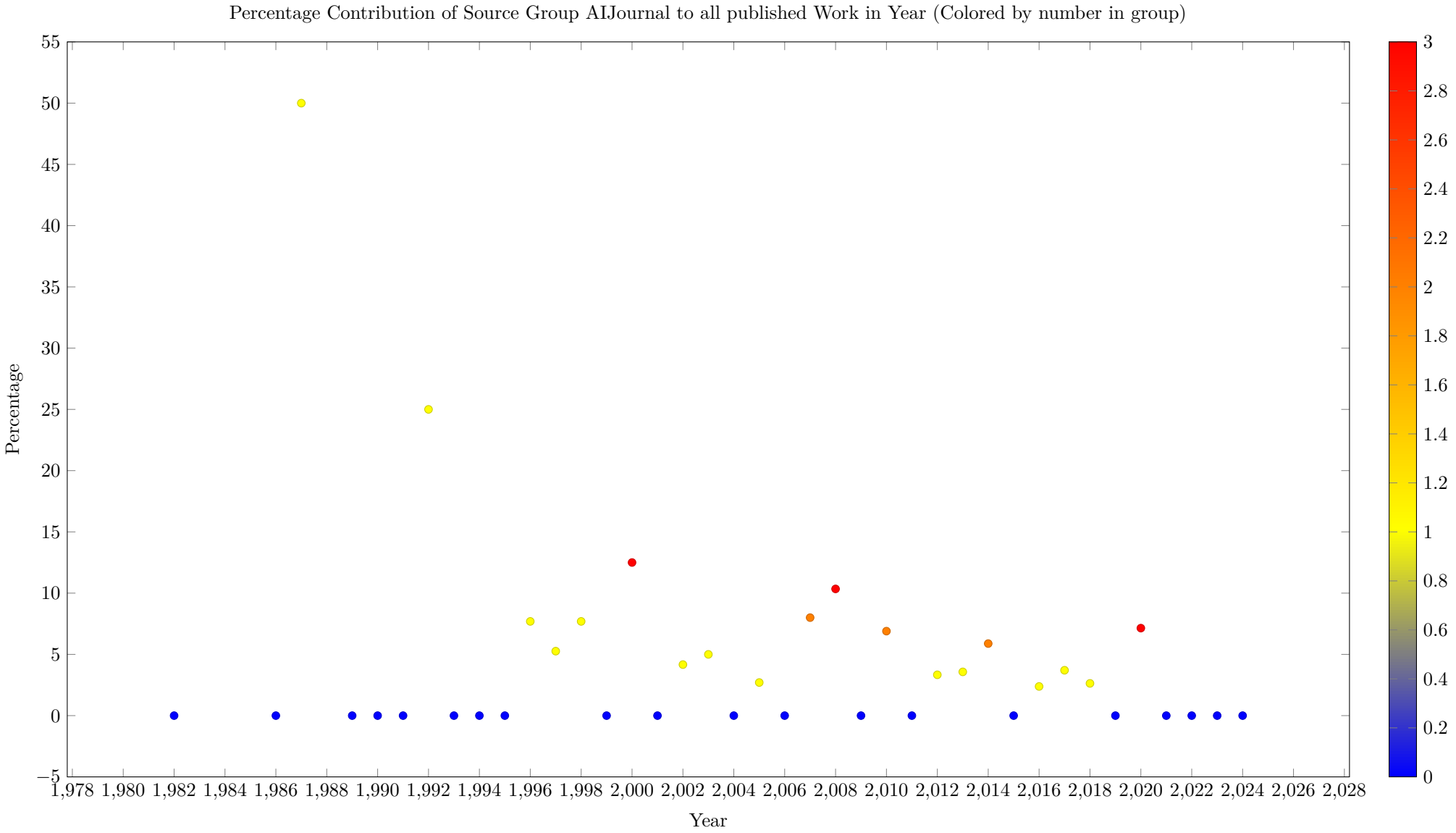

Percentage Contribution of Source Group ECAI to all published Work in Year (Colored by number in group)
Percentage
35
30
25
20
15
10
5
0
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
4
3.5
3
2.5
2
1.5
1
0.5
0

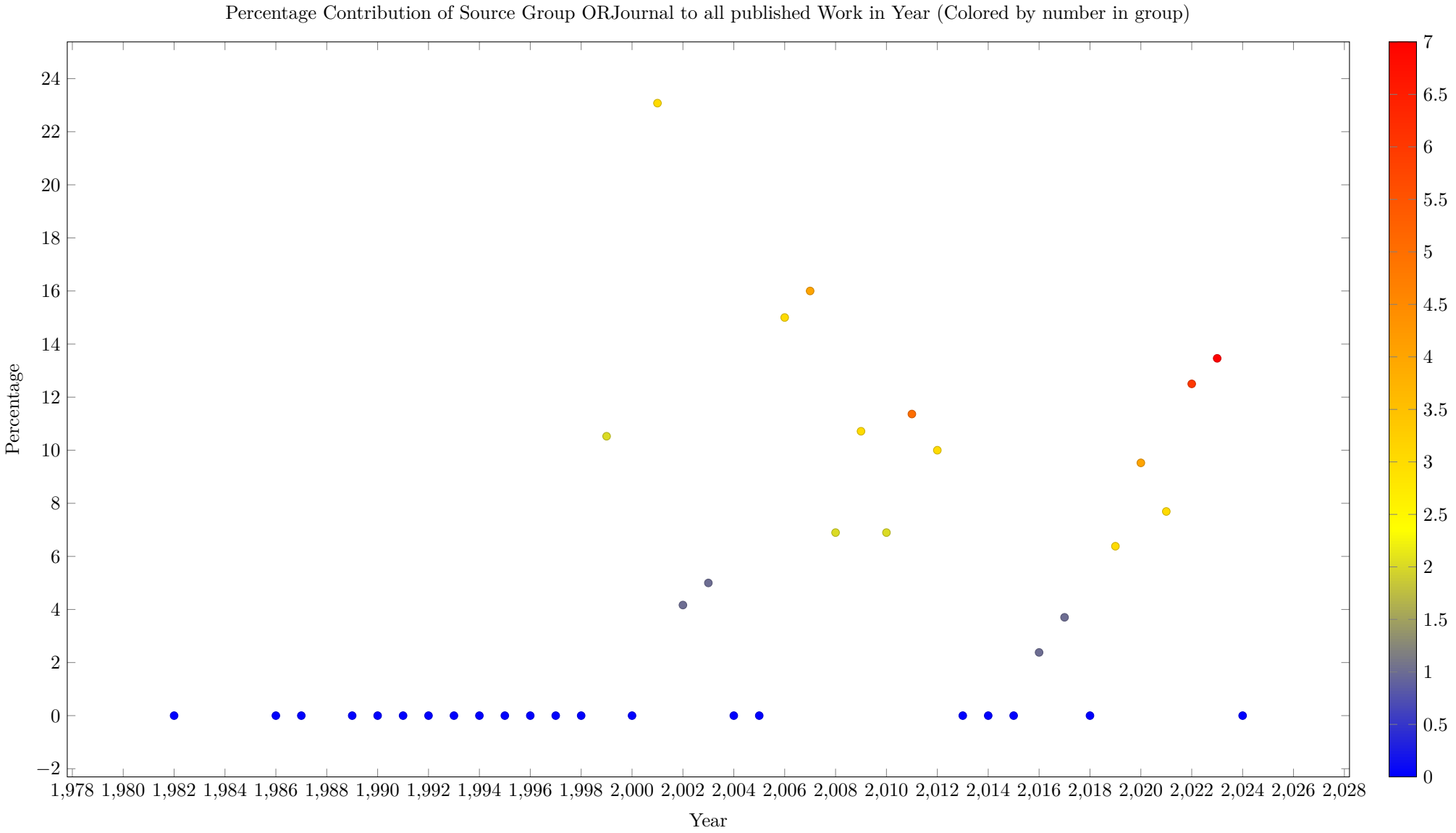

Percentage Contribution of Source Group OtherConf to all published Work in Year (Colored by number in group)
Percentage
0
10
20
30
40
50
60
70
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0
1
2
3
4
5
6
7
8

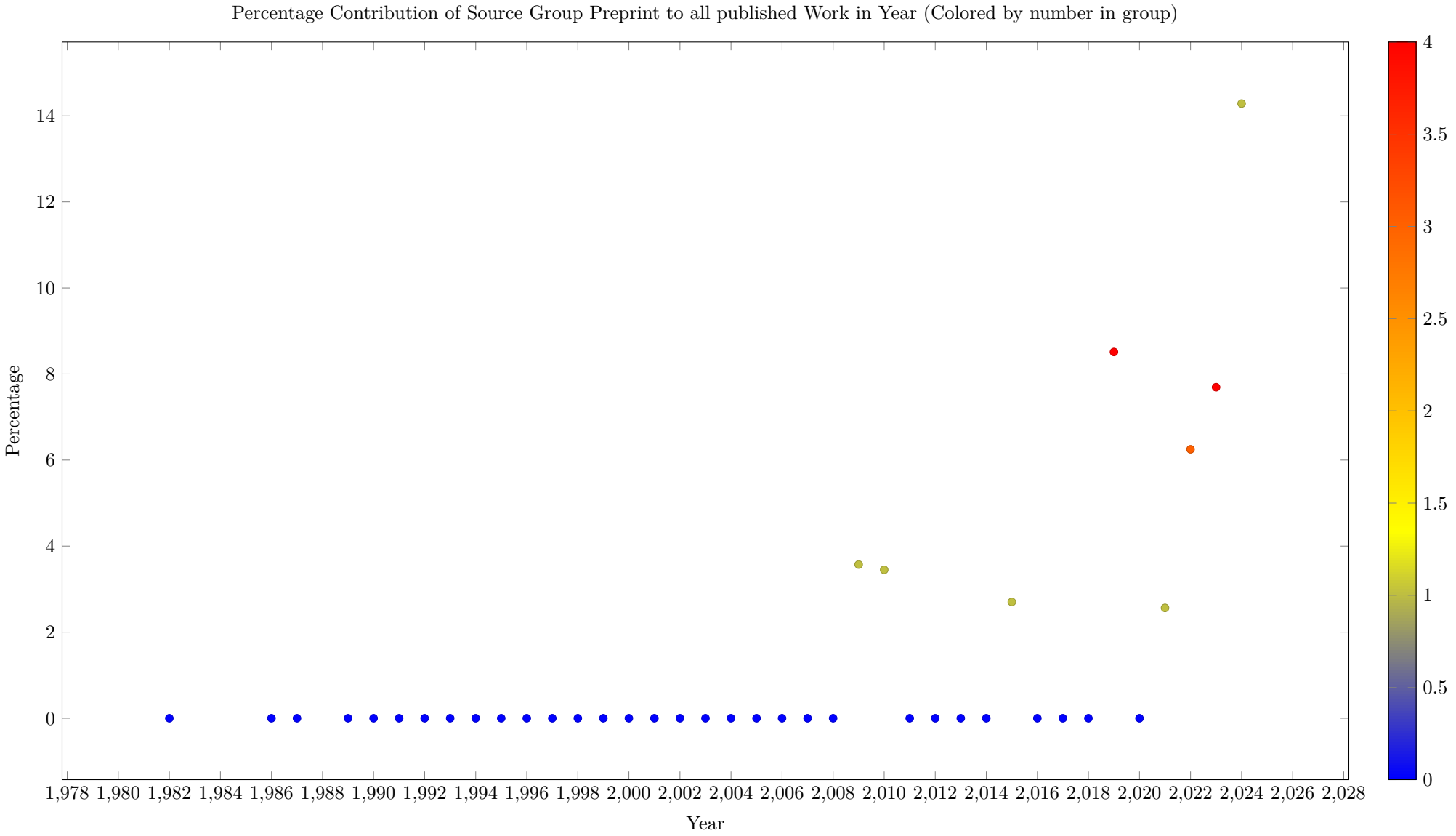

Percentage Contribution of Source Group Constraints to all published Work in Year (Colored by number in group)
Percentage
0
2
4
6
8
10
12
14
16
18
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

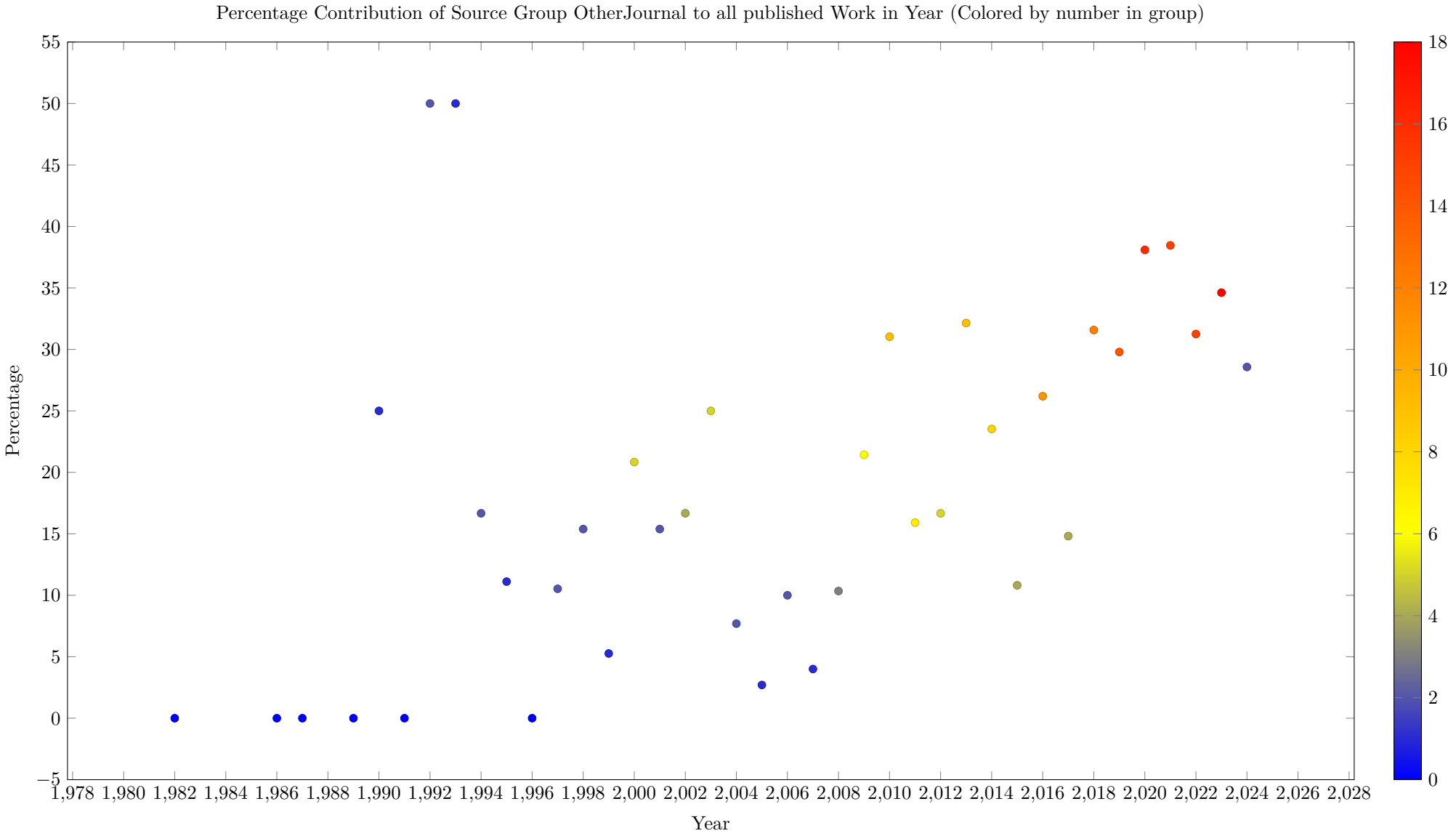

Percentage Contribution of Source Group EJOR to all published Work in Year (Colored by number in group)
Percentage
0
2
4
6
8
10
12
14
16
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3

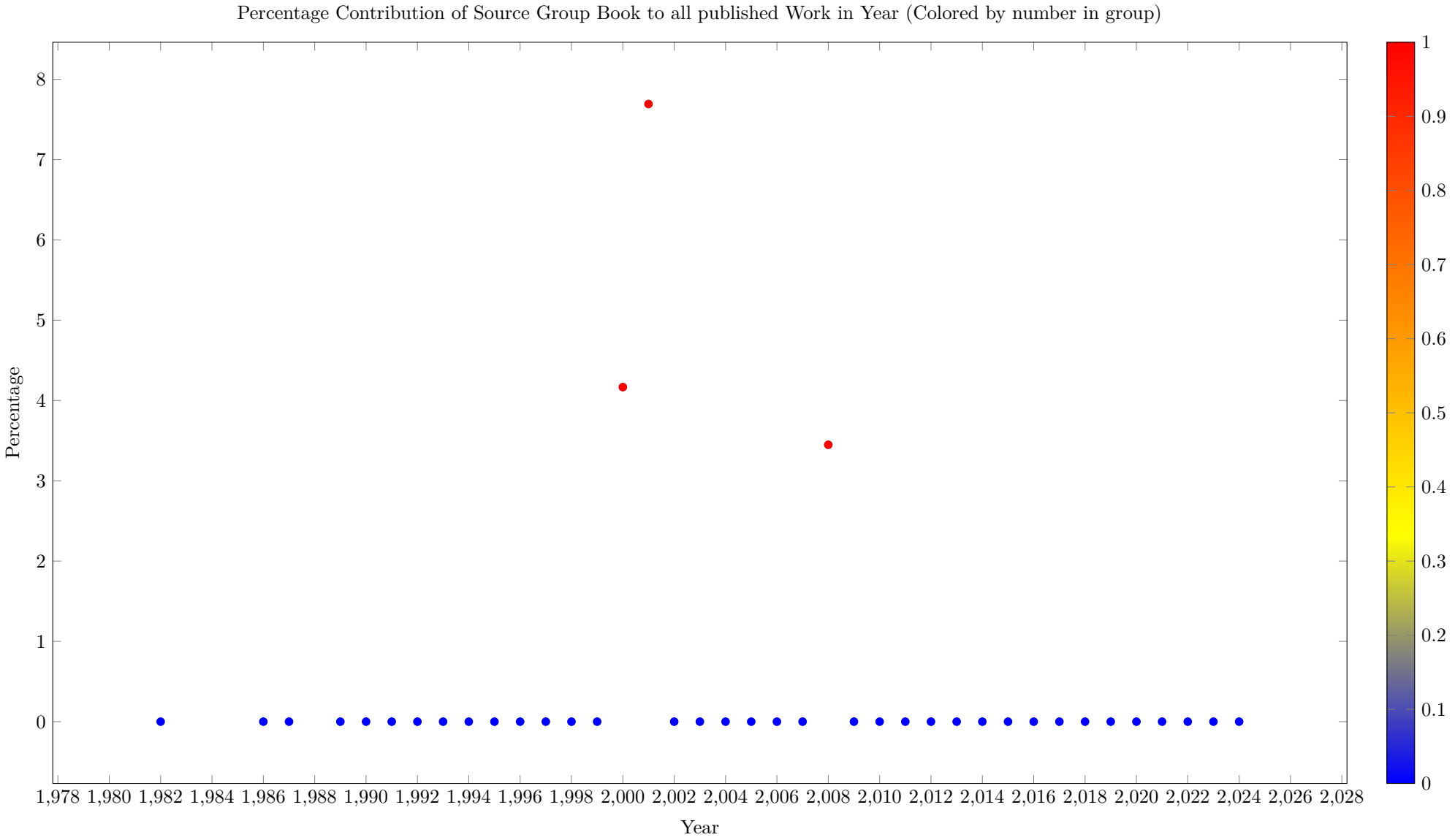

Percentage Contribution of Source Group InformsJC to all published Work in Year (Colored by number in group)
Percentage
0
2
4
6
8
10
12
14
16
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3


Percentage Contribution of Source Group AIJournal to all published Work in Year (Colored by number in group)
Percentage
55
50
45
40
35
30
25
20
15
10
5
0
−5
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0

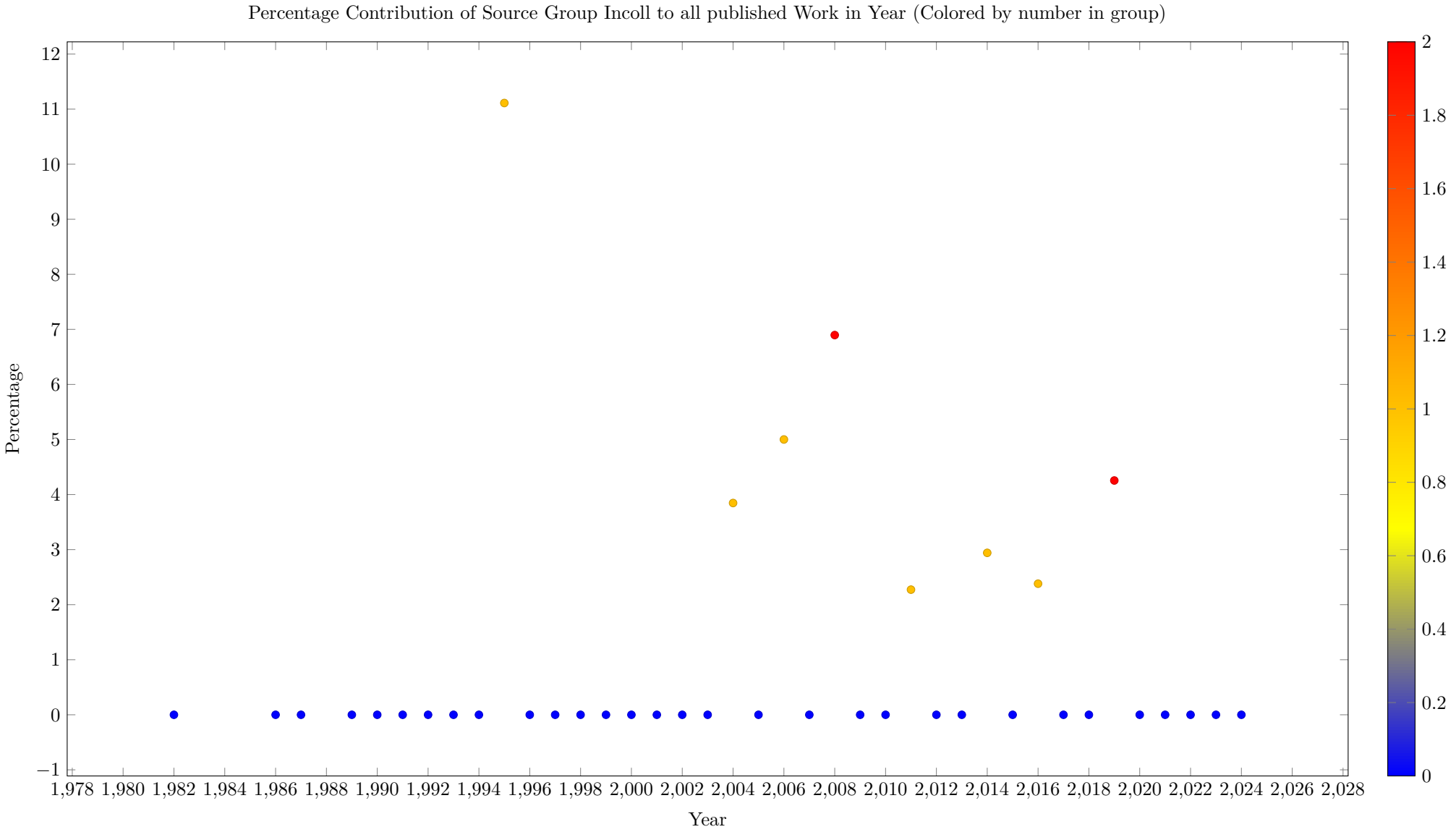

Percentage Contribution of Source Group ORJournal to all published Work in Year (Colored by number in group)
Percentage
24
22
20
18
16
14
12
10
8
6
4
2
0
−2
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0

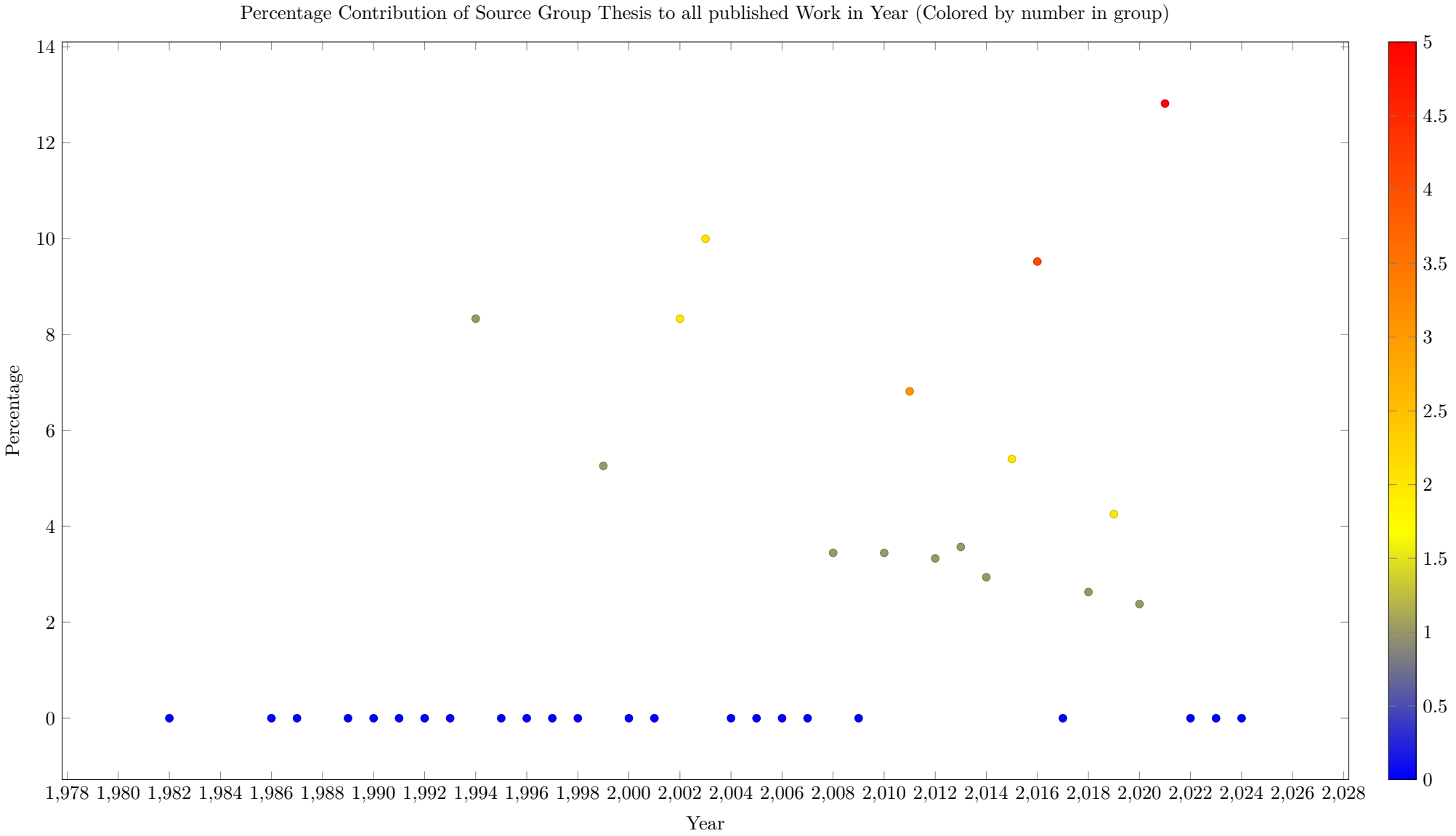

Percentage Contribution of Source Group Preprint to all published Work in Year (Colored by number in group)
Percentage
0
2
4
6
8
10
12
14
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0
0.5
1
1.5
2
2.5
3
3.5
4


Percentage Contribution of Source Group OtherJournal to all published Work in Year (Colored by number in group)
Percentage
55
50
45
40
35
30
25
20
15
10
5
0
−5
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
18
16
14
12
10
8
6
4
2
0


Percentage Contribution of Source Group Book to all published Work in Year (Colored by number in group)
Percentage
0
1
2
3
4
5
6
7
8
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Percentage Contribution of Source Group Inbook to all published Work in Year (Colored by number in group)
Percentage
12
11
10
9
8
7
6
5
4
3
2
1
0
−1
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0


Percentage Contribution of Source Group Incoll to all published Work in Year (Colored by number in group)
Percentage
12
11
10
9
8
7
6
5
4
3
2
1
0
−1
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
Year
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0


Percentage Contribution of Source Group Thesis to all published Work in Year (Colored by number in group)
Percentage
0
2
4
6
8
10
12
14
Year
1,978 1,980 1,982 1,984 1,986 1,988 1,990 1,992 1,994 1,996 1,998 2,000 2,002 2,004 2,006 2,008 2,010 2,012 2,014 2,016 2,018 2,020 2,022 2,024 2,026 2,028
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5