

SpecInt Branch Data

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1. introduction

This document serves to just present some branch data gathered from the SpecInt-2000 and SpecInt-95 benchmark suites.

2. General Statistics

General statistics for each of the five benchmark programs are presented in Figures 1 through 5 below. All data, here and below, are for executing 500 million instructions of each program after skipping the first 100 million instructions. All counts of events are dynamic unless specifically mentioned otherwise.

```
SimpleSim statistics 020314_2349:34
statistics for job=bzip2r logid=frodo23354

total instructions      600000000
included instructions  100000000: 500000000
branch paths          59335110
instructions per BP     8.4267
branch path statistics
IPBP mean              8.4267
IPBP variance          73.3976
IPBP stddev            8.5672
branch target-distance statistics
IPBT mean              21.4439
IPBT variance          1111.7523
IPBT stddev            33.3430
SS hammocks            13918698 (23.46 percent)
```

Figure 1. BZIP2 Statistics

```
SimpleSim statistics 020314_2351:29
statistics for job=parser logid=frodo23372

total instructions      600000000
included instructions  100000000: 500000000
branch paths          53844018
instructions per BP     9.2861
branch path statistics
IPBP mean              9.2856
IPBP variance          79.5710
IPBP stddev            8.9203
branch target-distance statistics
IPBT mean              36.9459
IPBT variance          18020.5341
IPBT stddev            134.2406
SS hammocks            22663223 (42.09 percent)
```

Figure 2. PARSER Statistics

SimpleSim statistics 020314_2348:09
statistics for job=gzip logid=frodo23358

total instructions	600000000
included instructions	100000000: 500000000
branch paths	67119207
instructions per BP	7.4494
branch path statistics	
IPBP mean	7.4494
IPBP variance	33.8469
IPBP stddev	5.8178
branch target-distance statistics	
IPBT mean	31.4887
IPBT variance	1406.7256
IPBT stddev	37.5063
SS hammocks	30327792 (45.18 percent)

Figure 3. GZIP Statistics

SimpleSim statistics 020315_0049:27
statistics for job=gap logid=piranha25524

total instructions	600000000
included instructions	0: 600000000
branch paths	59087829
instructions per BP	10.1544
branch path statistics	
IPBP mean	10.1544
IPBP variance	233.9126
IPBP stddev	15.2942
branch target-distance statistics	
IPBT mean	27.6369
IPBT variance	4443.7588
IPBT stddev	66.6615
SS hammocks	10291414 (17.42 percent)

Figure 4. GAP Statistics

SimpleSim statistics 020314_2349:39
statistics for job=go logid=frodo23356

total instructions	600000000
included instructions	100000000: 500000000
branch paths	60525024
instructions per BP	8.2610
branch path statistics	
IPBP mean	8.2610
IPBP variance	54.9426
IPBP stddev	7.4123
branch target-distance statistics	
IPBT mean	39.5681
IPBT variance	5597.9021
IPBT stddev	74.8191
SS hammocks	21607188 (35.70 percent)

Figure 5. GO Statistics

3. Branch Path Lengths

The graphs in this section show percent density functions and percent distributions for branch path lengths in each of the five SpecInt programs that we have characterized. Figures 6 and 7 are for the **bzip2** benchmark program.

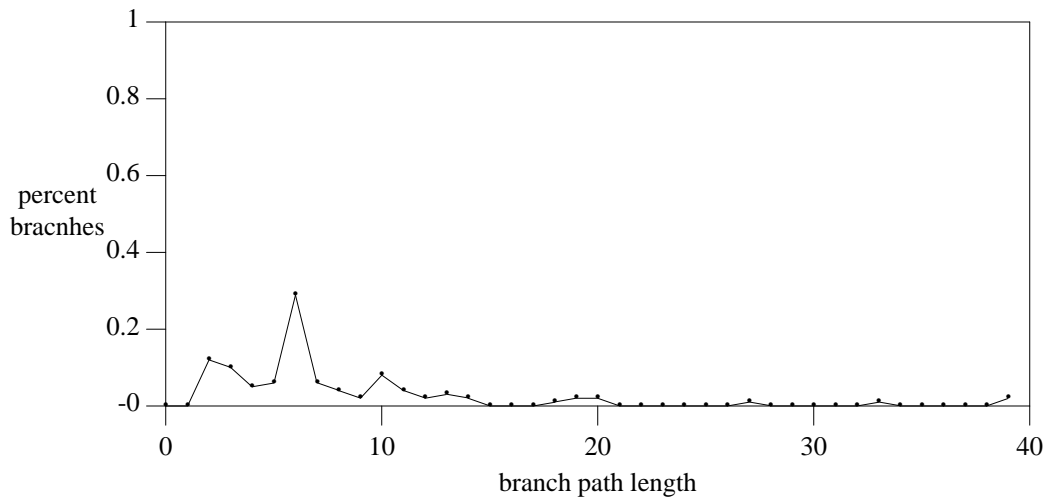


Figure 6. BZIP2 -- Branch Path Length Percent Density

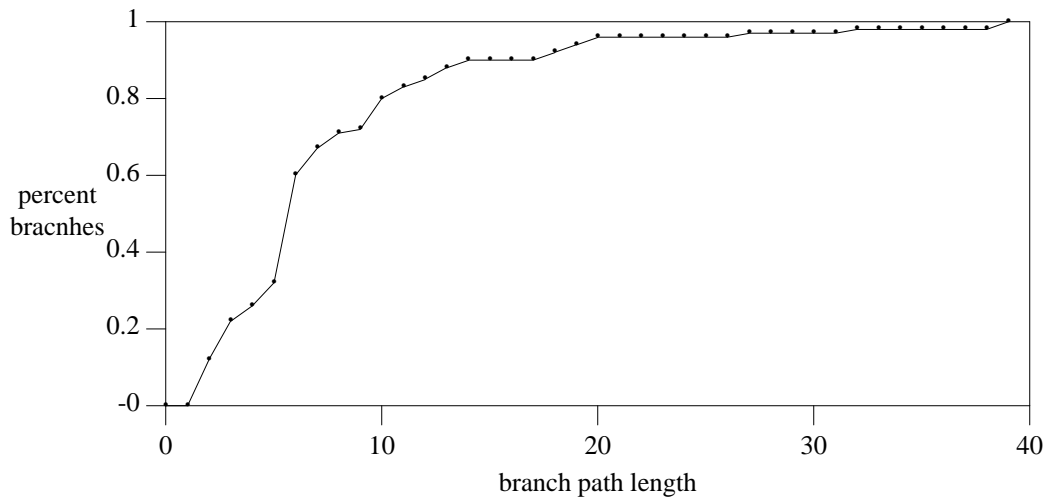


Figure 7. BZIP2 -- Branch Path Length Percent Distribution

Figures 8 and 9 are for the **parser** benchmark program.

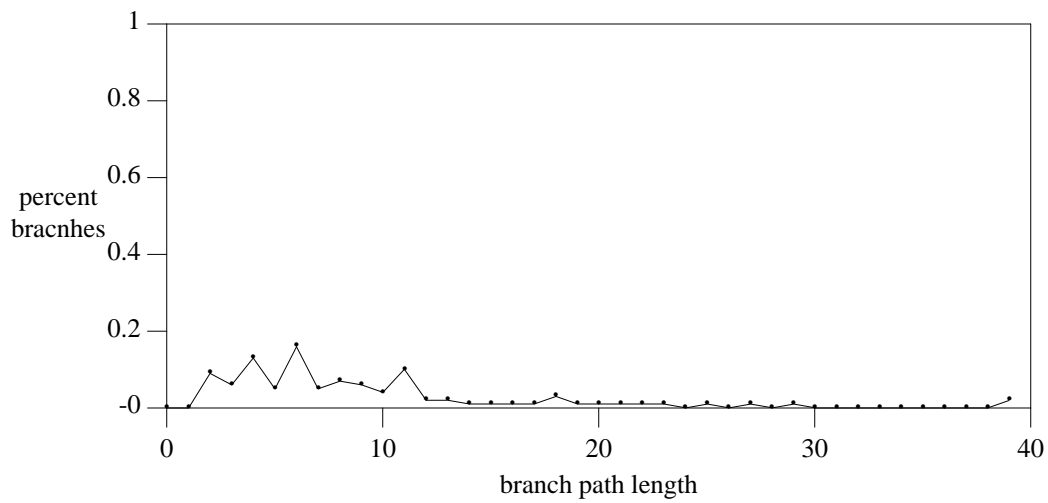


Figure 8. PARSER -- Branch Path Length Percent Density

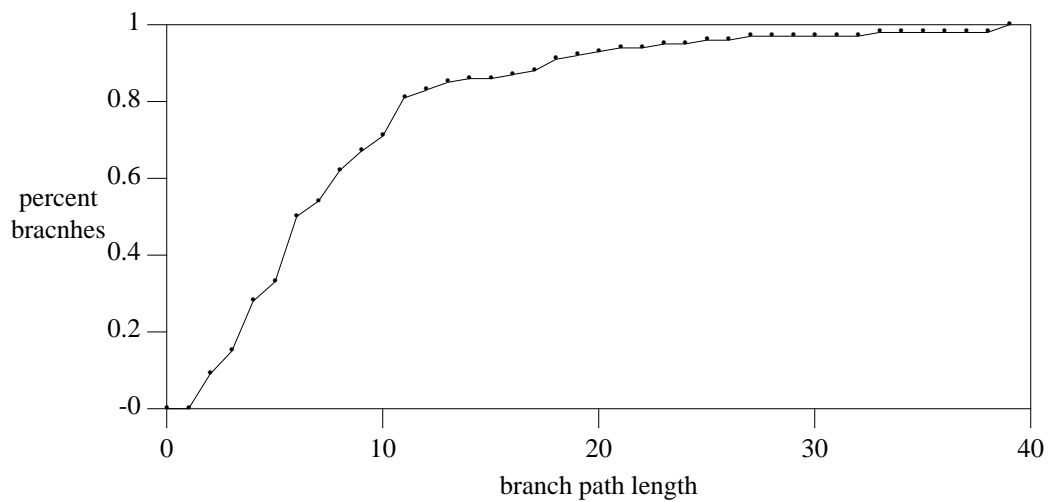


Figure 9. PARSER -- Branch Path Length Percent Distribution

Figures 10 and 11 are for the **gzip** benchmark program.

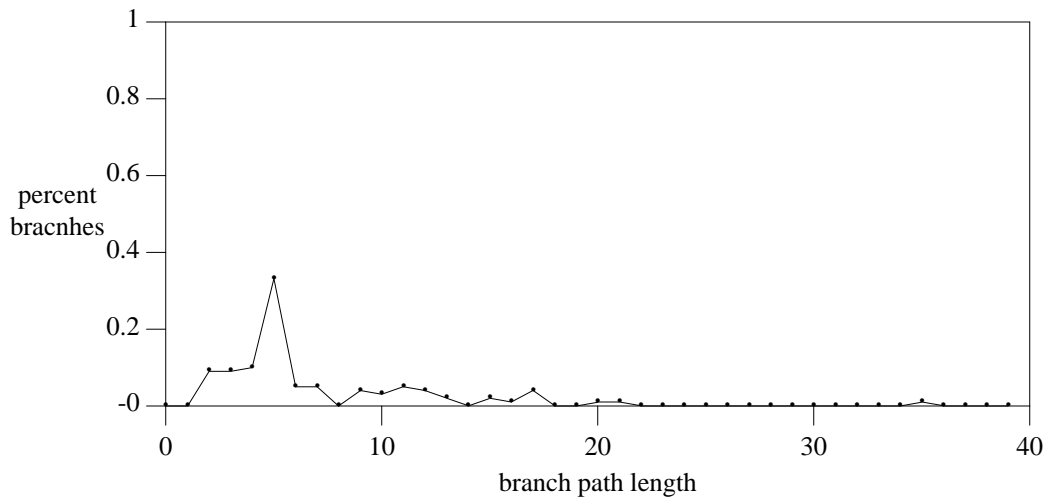


Figure 10. GZIP -- Branch Path Length Percent Density

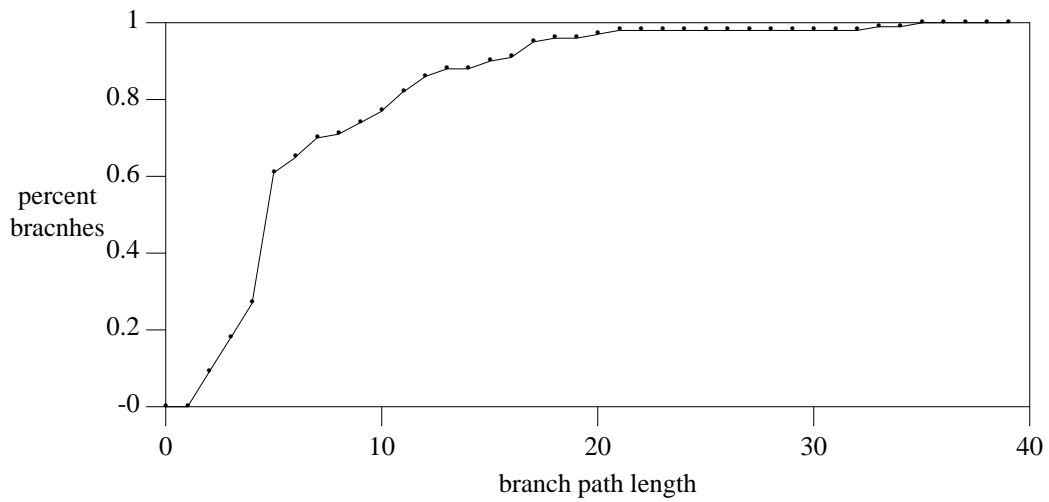


Figure 11. GZIP -- Branch Path Length Percent Distribution

Figures 12 and 13 are for the **gap** benchmark program.

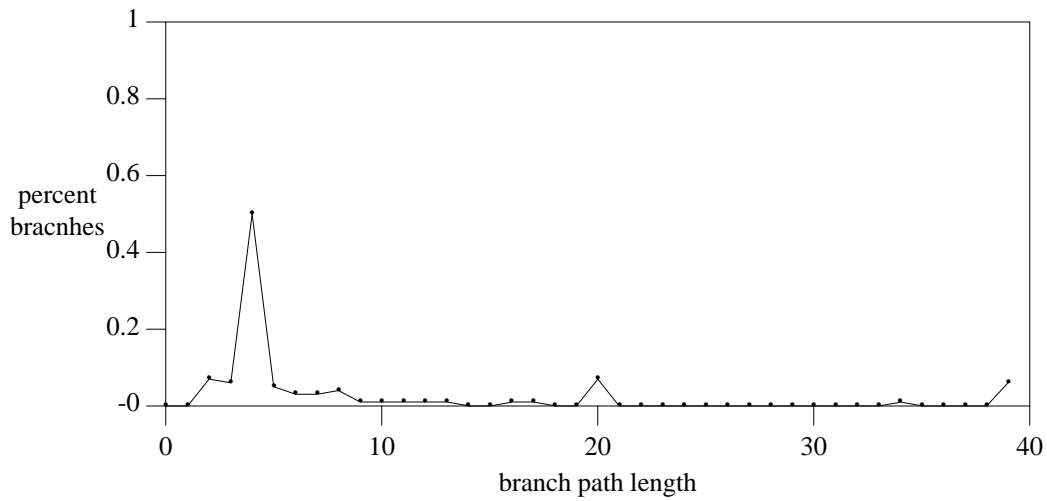


Figure 12. GAP -- Branch Path Length Percent Density

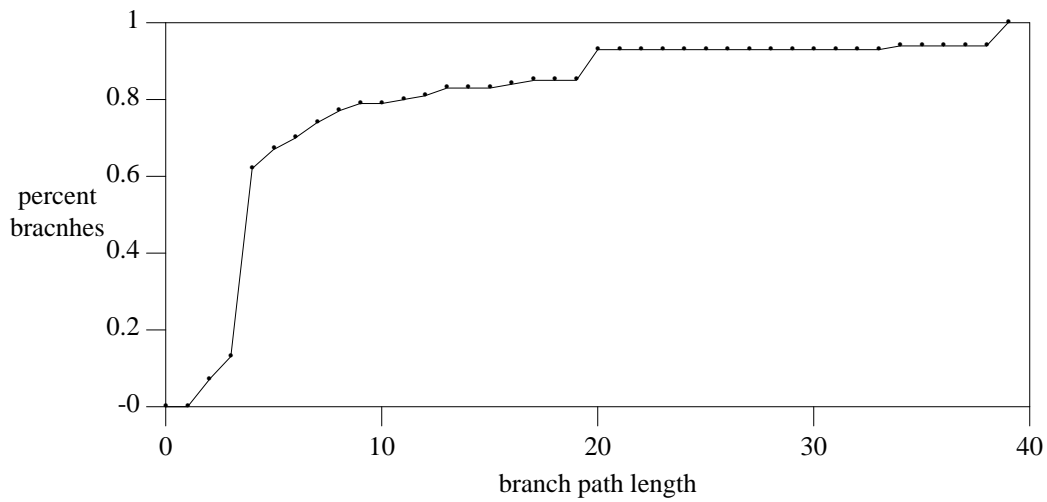


Figure 13. GAP -- Branch Path Length Percent Distribution

Figures 14 and 15 are for the **go** benchmark program.

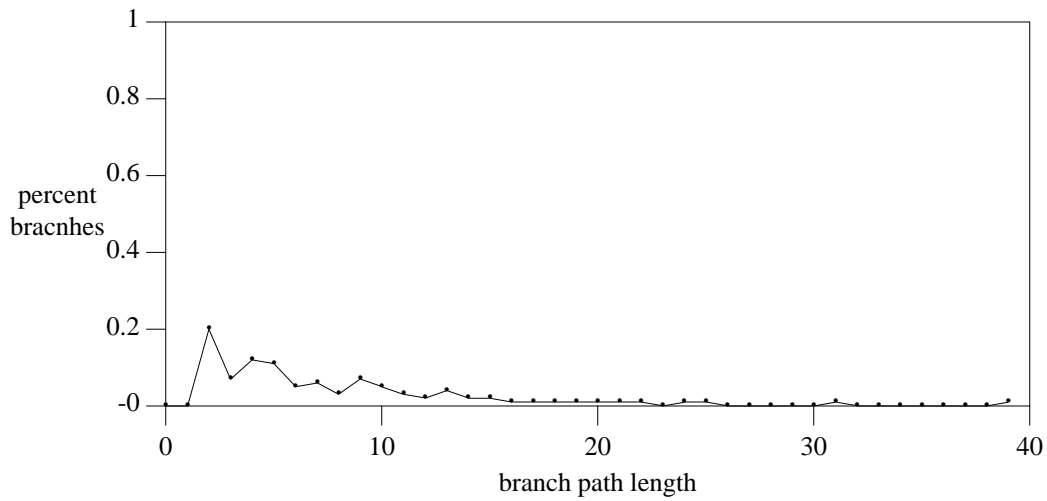


Figure 14. GO -- Branch Path Length Percent Density

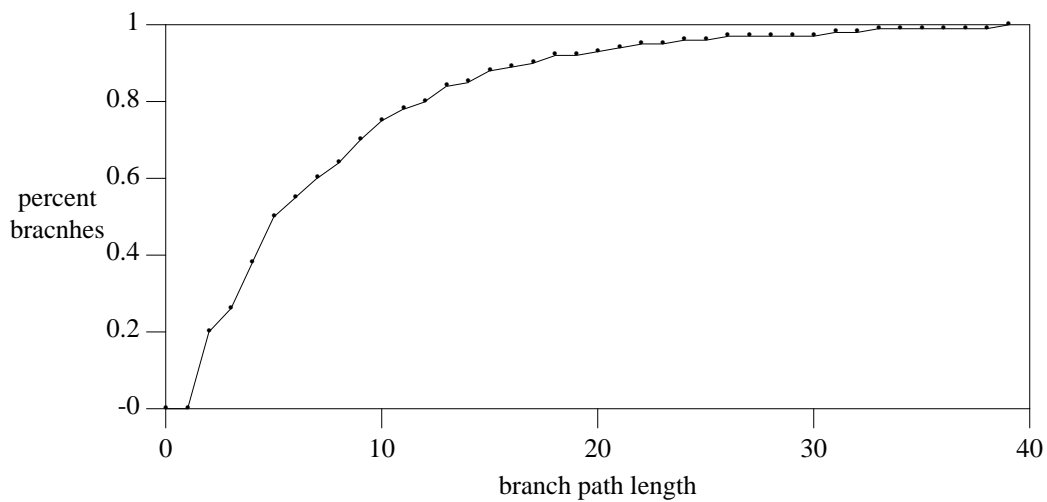


Figure 15. GO -- Branch Path Length Percent Distribution

4. Conditional Branch Domain Sizes

The graphs in this section show percent density functions and percent distributions for conditional branch domain sizes in each of the five SpecInt programs that we have characterized. Figures 16 and 17 are for the **bzip2** benchmark program.

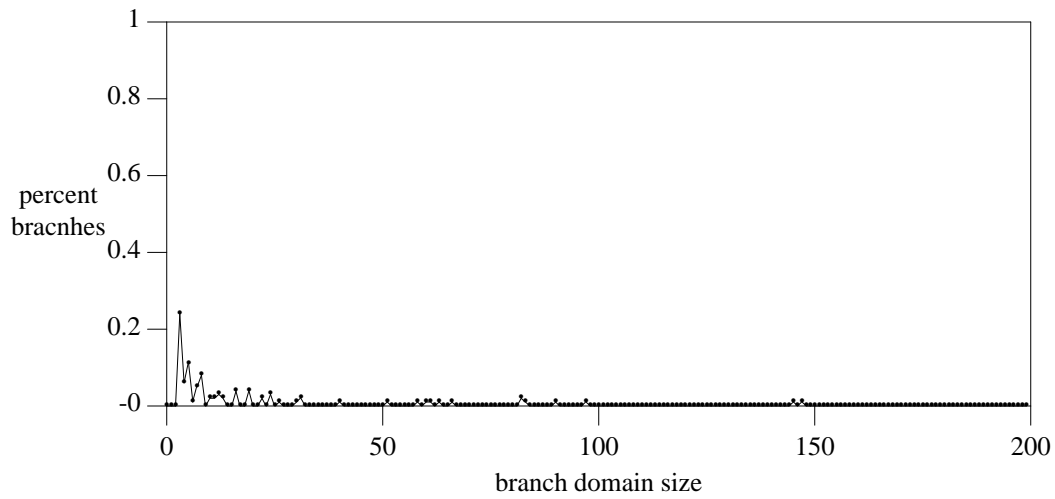


Figure 16. BZIP2 -- Branch Domain Size Percent Density

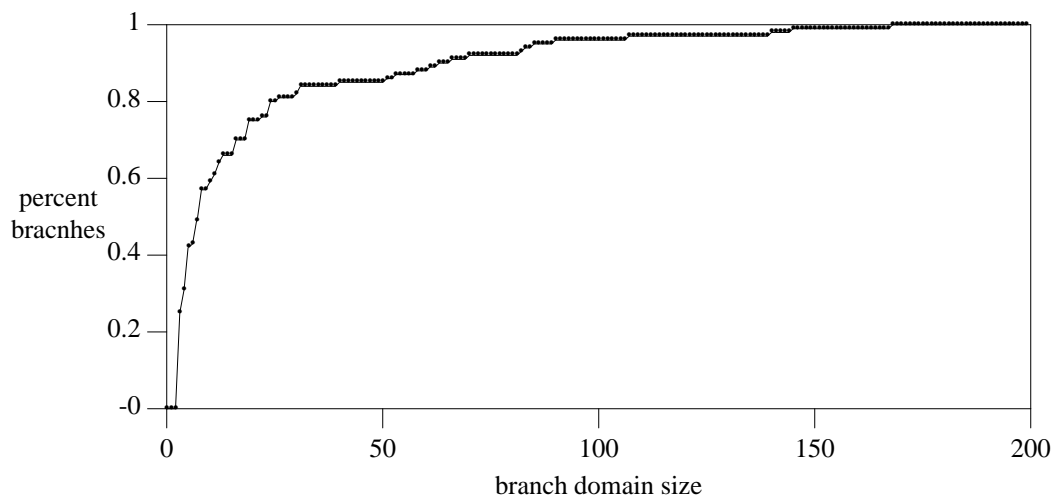


Figure 17. BZIP2 -- Branch Domain Size Percent Distribution

Figures 18 and 19 are for the **parser** benchmark program.

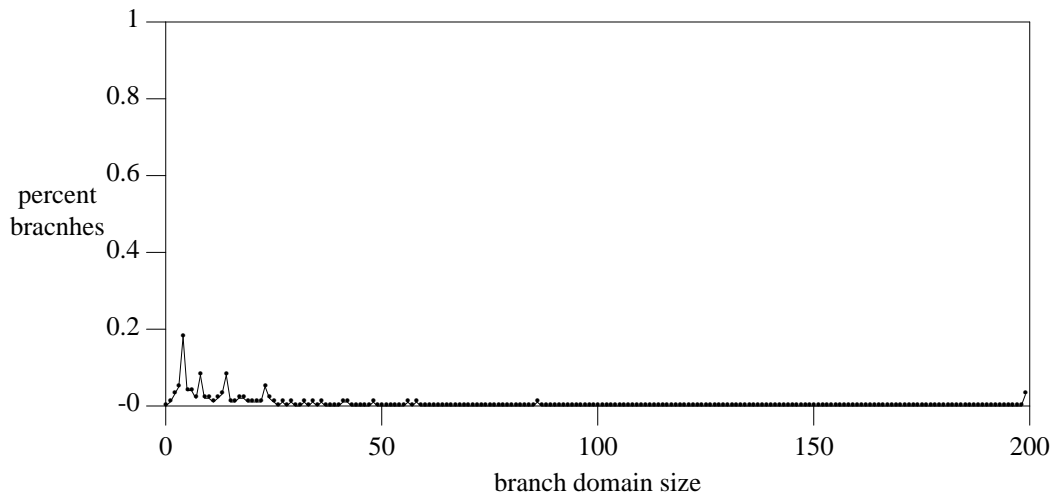


Figure 18. PARSER -- Branch Domain Size Percent Density

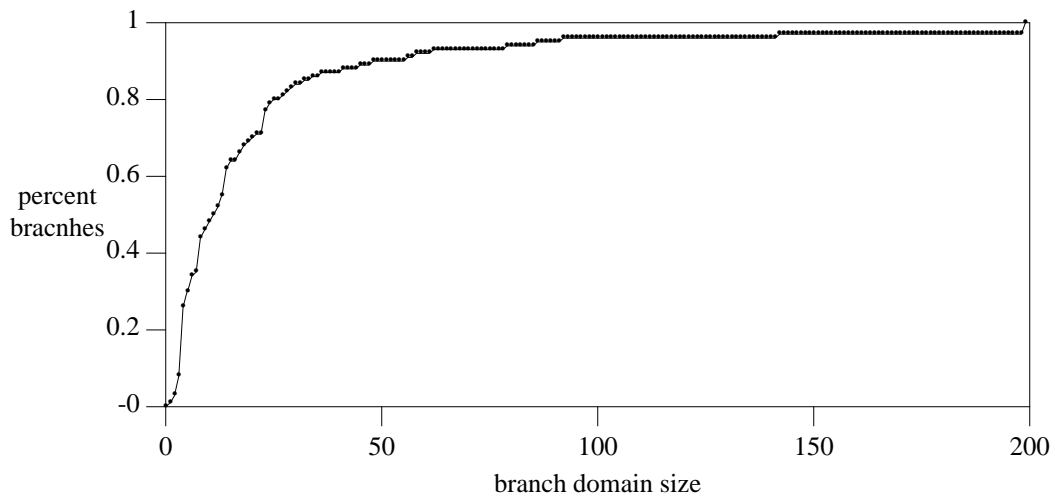


Figure 19. PARSER -- Branch Domain Size Percent Distribution

Figures 20 and 21 are for the **gzip** benchmark program.

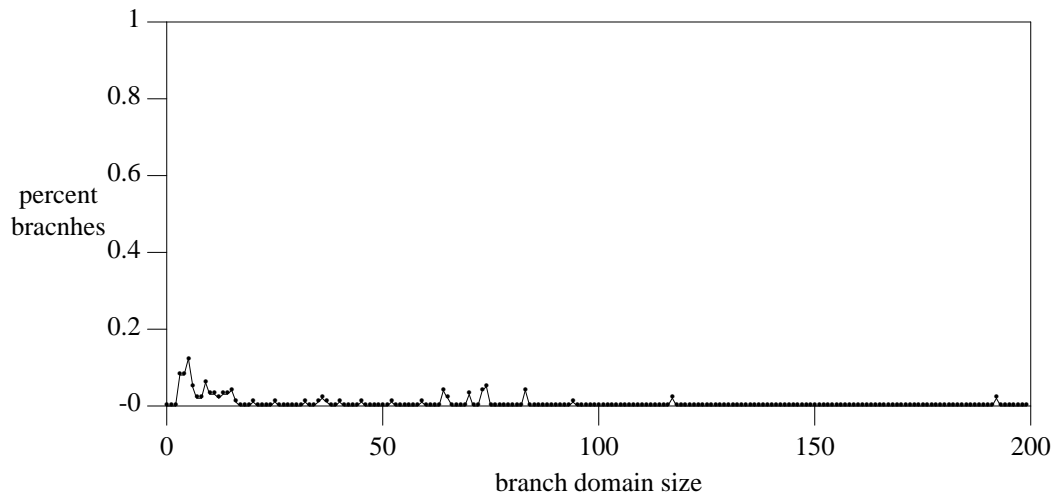


Figure 20. GZIP -- Branch Domain Size Percent Density

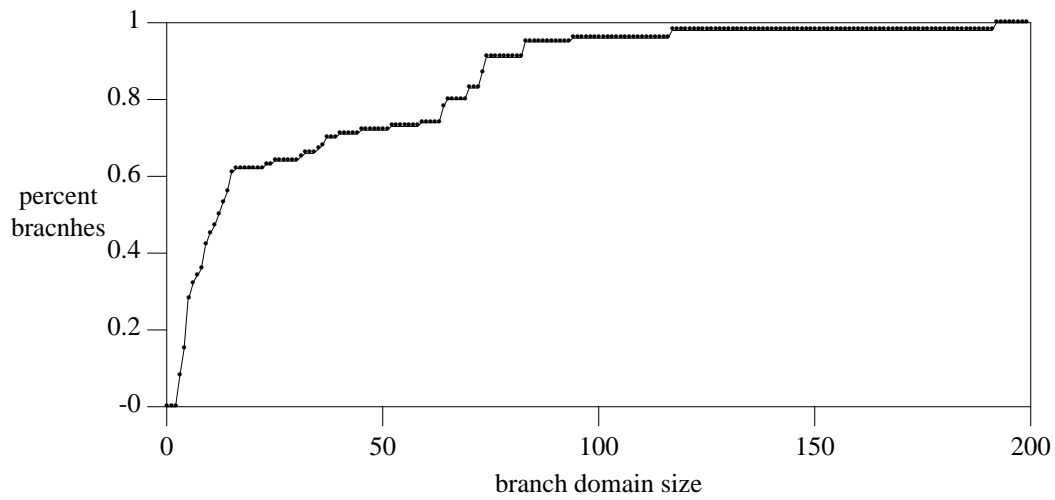


Figure 21. GZIP -- Branch Domain Size Percent Distribution

Figures 22 and 23 are for the **gap** benchmark program.

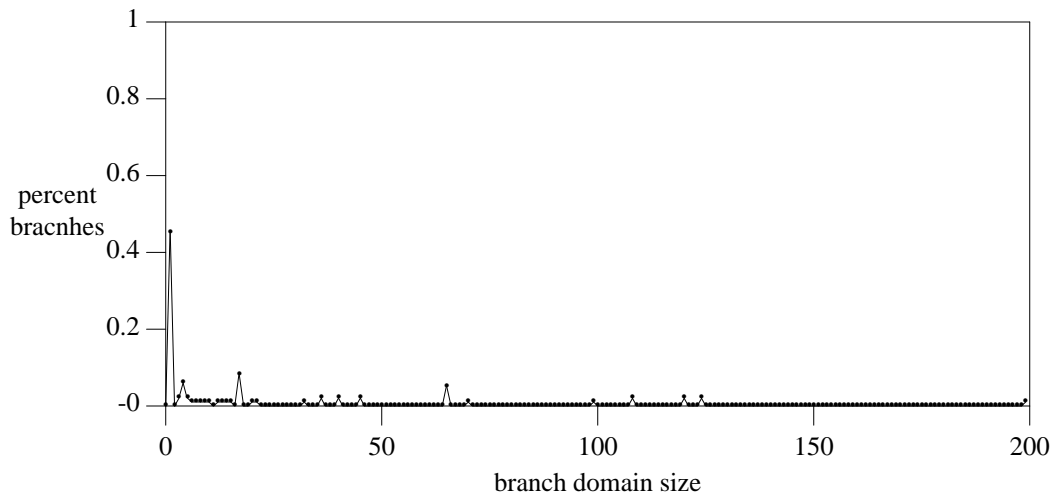


Figure 22. GAP -- Branch Domain Size Percent Density

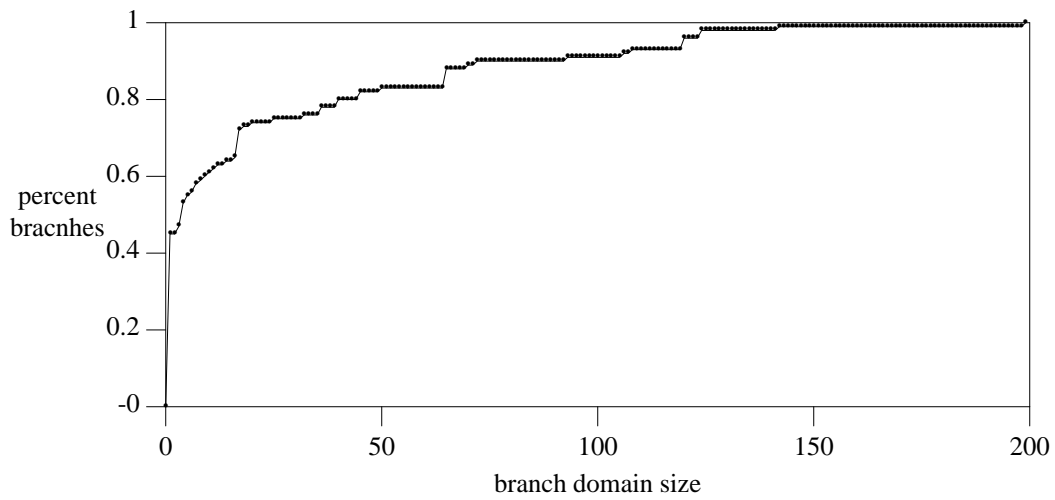


Figure 23. GAP -- Branch Domain Size Percent Distribution

Figures 24 and 25 are for the **go** benchmark program.

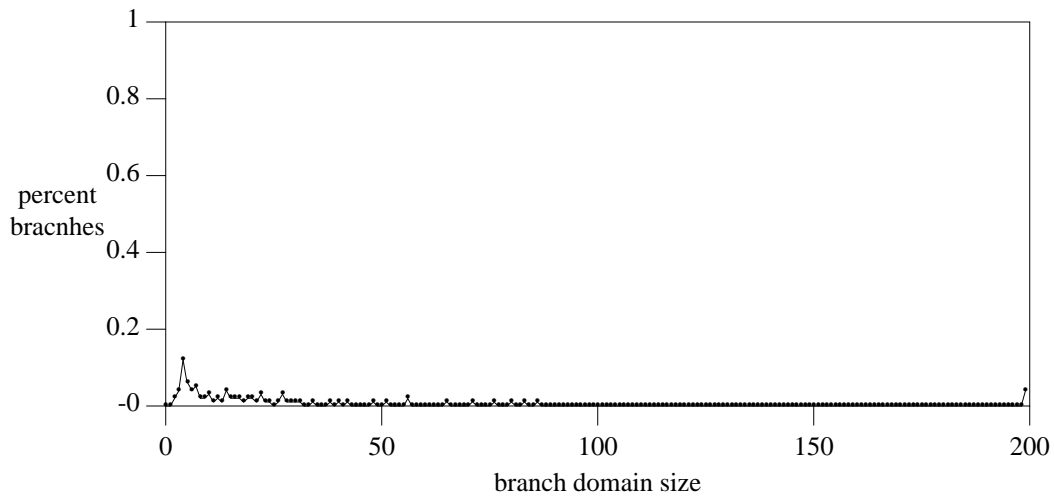


Figure 24. GO -- Branch Domain Size Percent Density

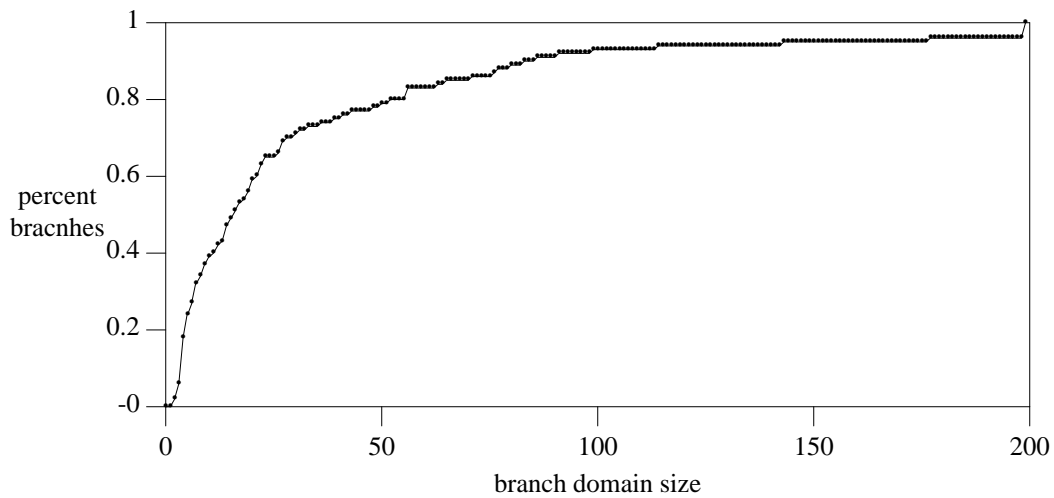


Figure 25. GO -- Branch Domain Size Percent Distribution

5. Simple Single-Sides Hammock Branch Domain Sizes

The graphs in this section show percent density functions and percent distributions for simple single-sided conditional branch domain sizes in each of the five SpecInt programs that we have characterized. Figures 26 and 27 are for the **bzip2** benchmark program.

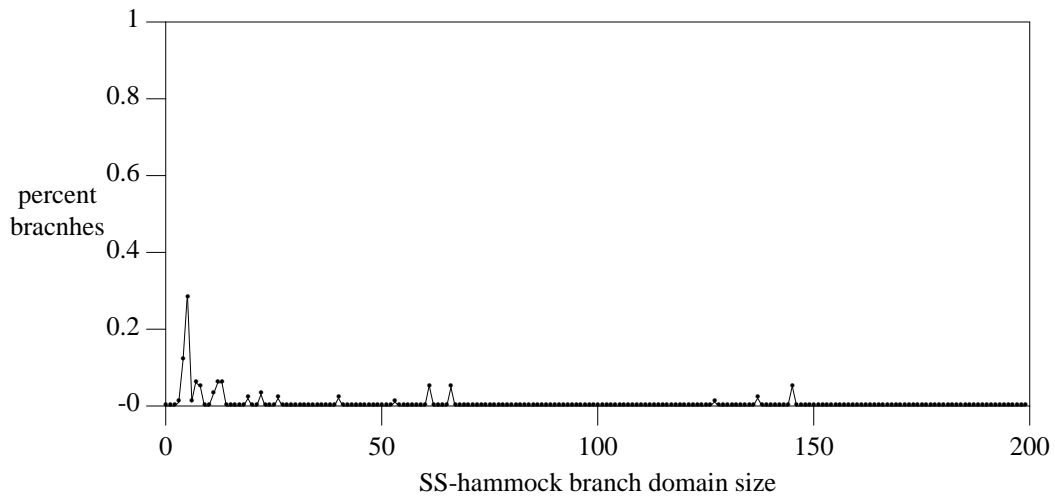


Figure 26. BZIP2 -- SS-Hammock Domain Size Percent Density

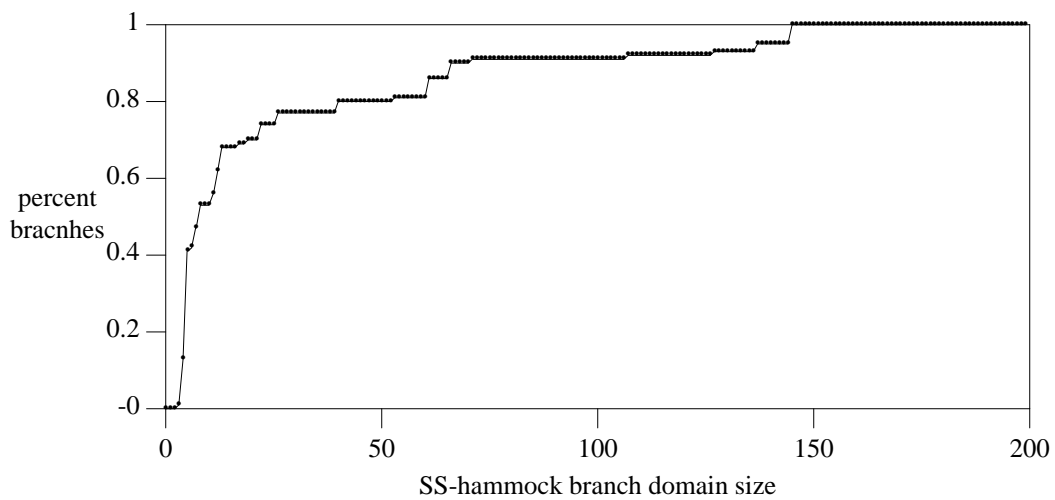


Figure 27. BZIP2 -- SS-Hammock Domain Size Percent Distribution

Figures 28 and 29 are for the **parser** benchmark program.

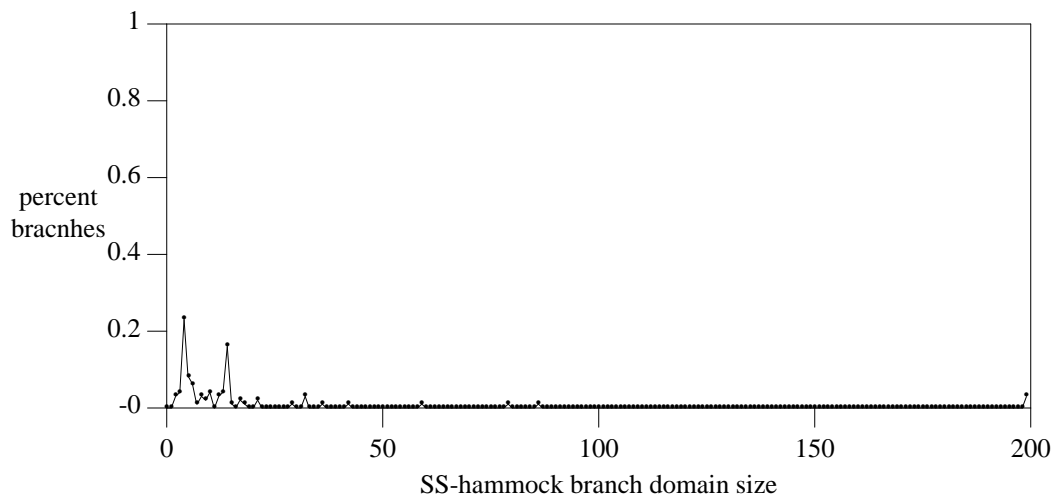


Figure 28. PARSER -- SS-Hammock Domain Size Percent Density

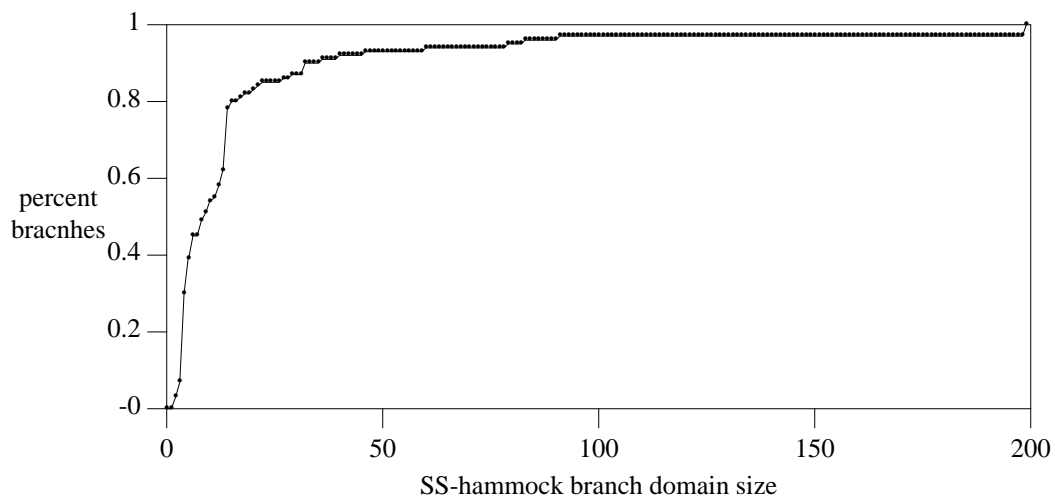


Figure 29. PARSER -- SS-Hammock Domain Size Percent Distribution

Figures 30 and 31 are for the **gzip** benchmark program.

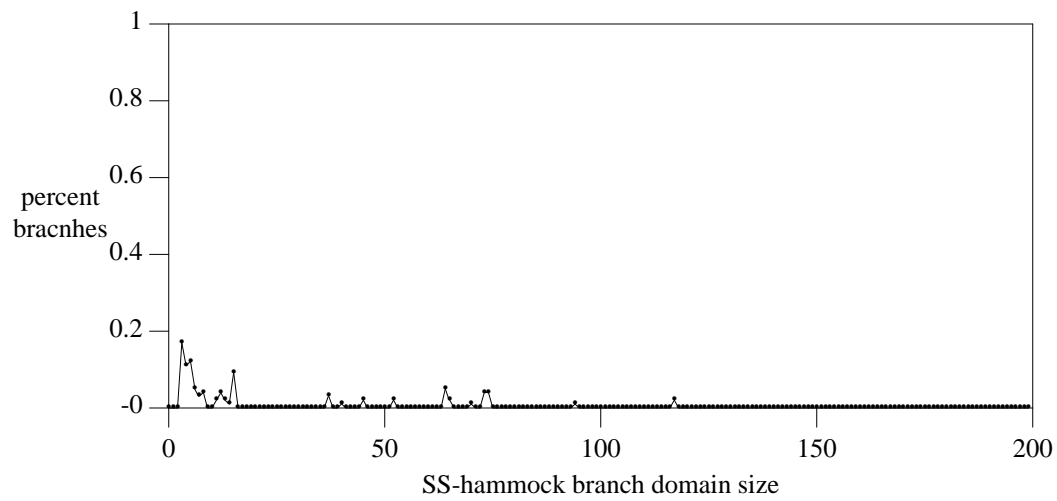


Figure 30. GZIP -- SS-Hammock Domain Size Percent Density

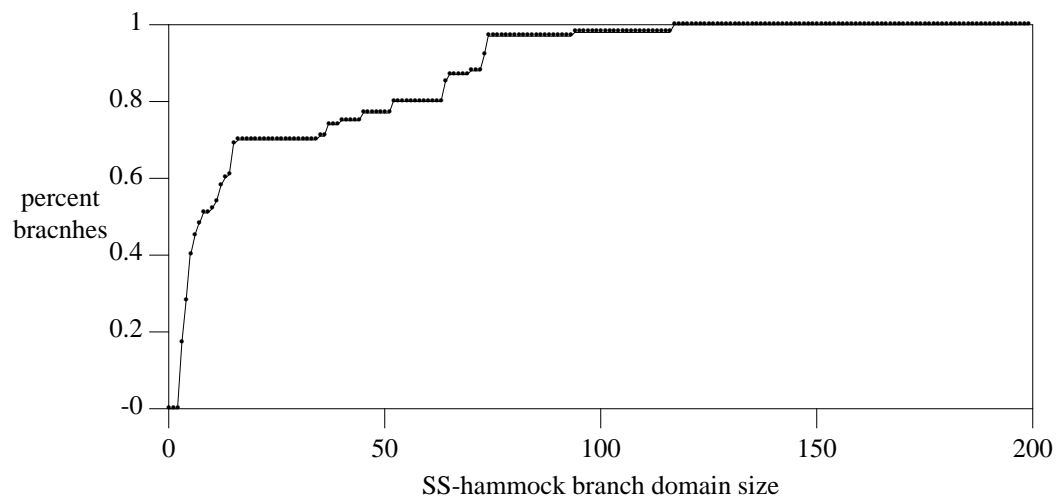


Figure 31. GZIP -- SS-Hammock Domain Size Percent Distribution

Figures 32 and 33 are for the **gap** benchmark program.

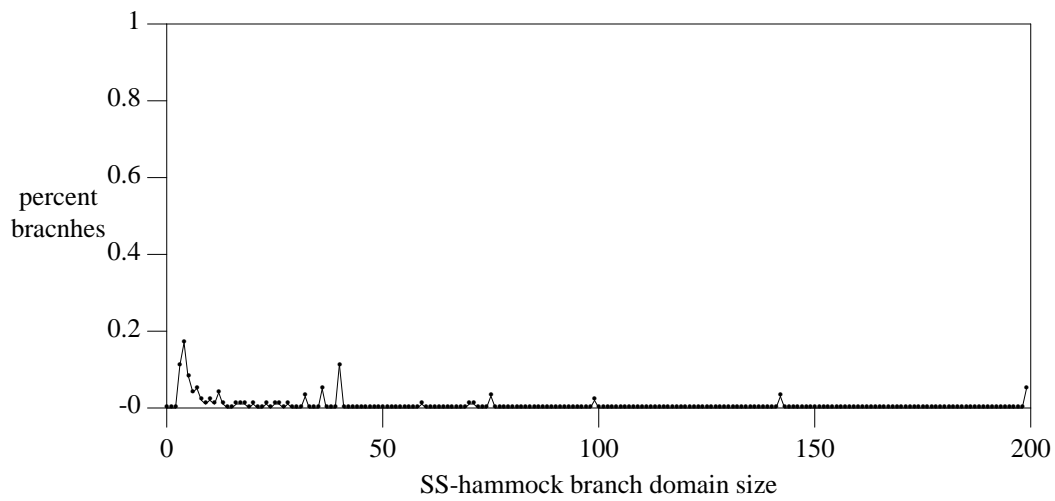


Figure 32. GAP -- SS-Hammock Domain Size Percent Density

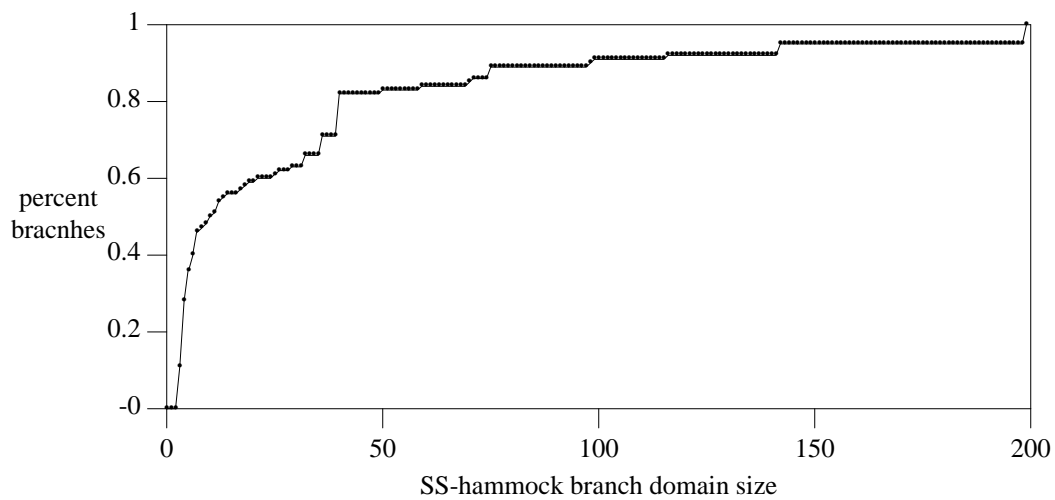


Figure 33. GAP -- SS-Hammock Domain Size Percent Distribution

Figures 34 and 35 are for the **go** benchmark program.

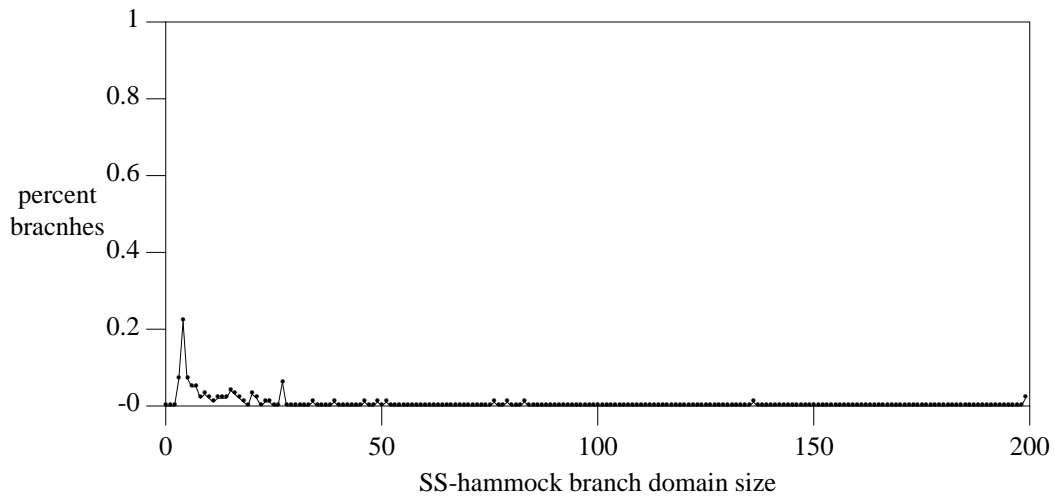


Figure 34. GO -- SS-Hammock Domain Size Percent Density

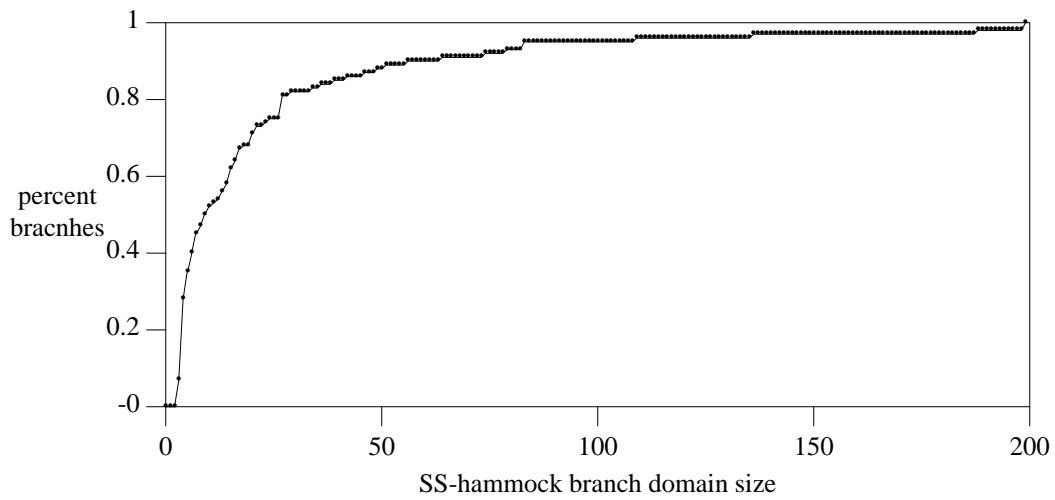


Figure 35. GO -- SS-Hammock Domain Size Percent Distribution

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