

ON-LINE APPENDICES FOR THE PAPER *SPEEDING UP THE STRUCTURAL
ANALYSIS OF METABOLIC NETWORK MODELS USING THE
FREDMAN-KHACHIYAN ALGORITHM B*

NAFISEH SEDAGHAT, TAMON STEPHEN, AND LEONID CHINDELEVITCH

APPENDIX A. SUMMARY OF RESULTS BASED ON SPLITTING VARIABLE DECISIONS

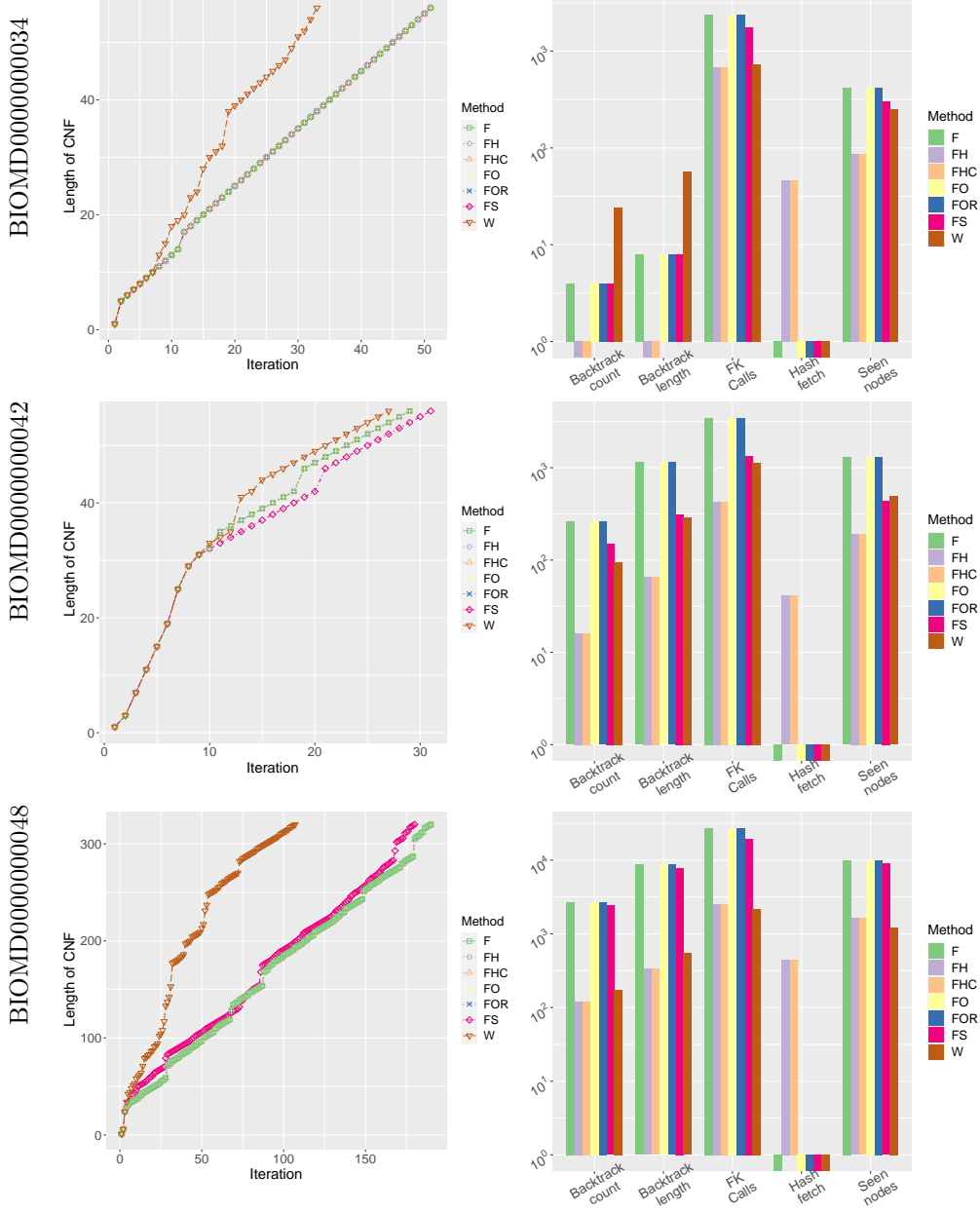


FIGURE 1. The figures in each row belongs to a model. The figures in the first column show progression of constructing CNF versus iterations in *FK*-dualization algorithm. The figures in the second column illustrate how beneficial each improvement is in *FK*-dualization based on five measures: ‘Backtrack count’ shows how many times wrong branches of tree of assignments have been chosen to go through that finally it had to return to the higher levels; ‘Backtrack length’ shows how deep it has gone through the wrong branches; ‘Seen nodes’ shows the number of variables that have been set to either *true* or *false* or both to reach to the conflicting assignment(s); ‘FK Calls’ indicates to the number of recursive calls to *FK* algorithm; and ‘Hash fetch’ shows the number of successful fetches to the hash table in case that keys are not stored in the canonical form and if $|C| < \tau$ and $|D| < \tau$ where $\tau = 3$, the hash table is not used.

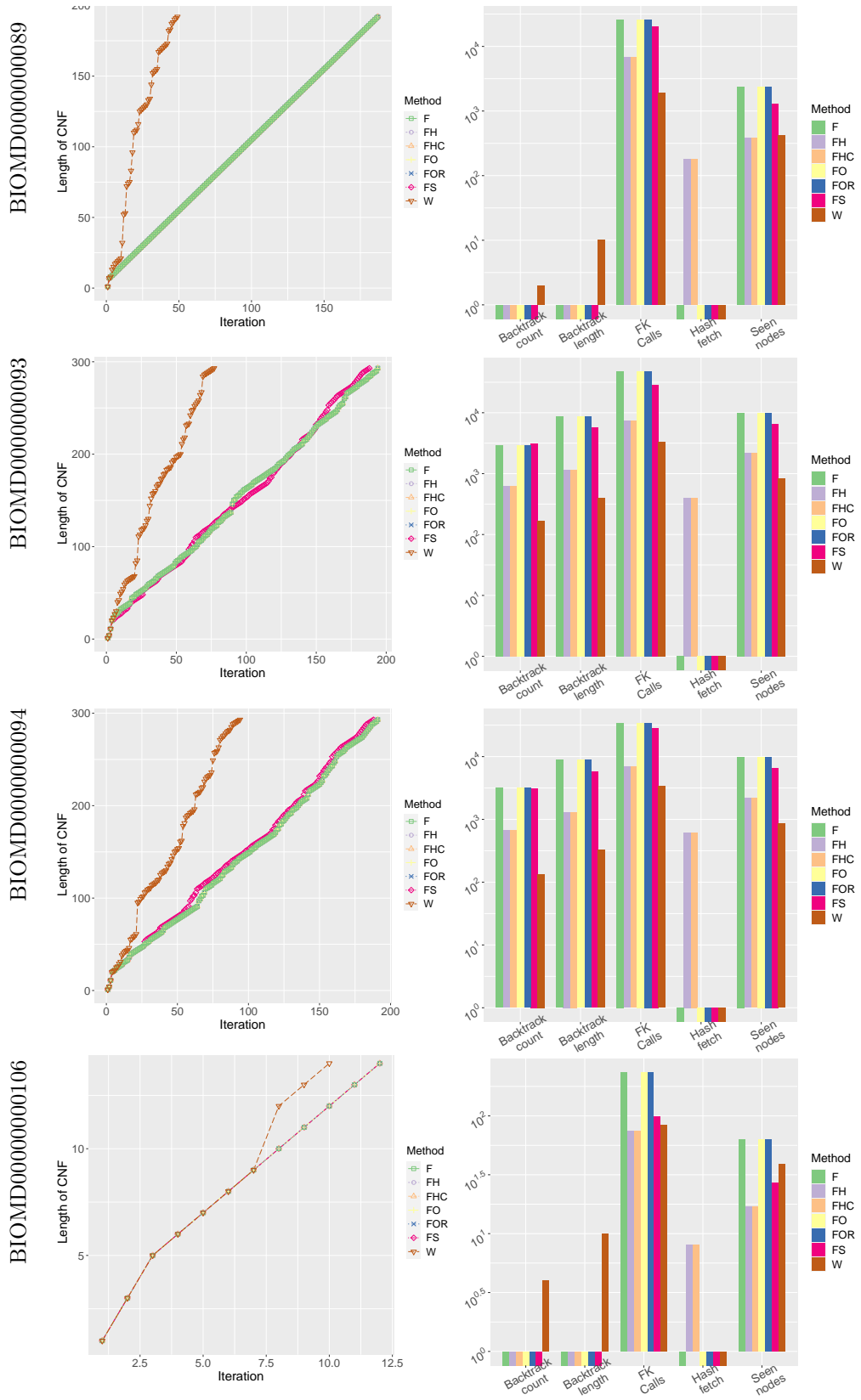


FIGURE 1. Continued.

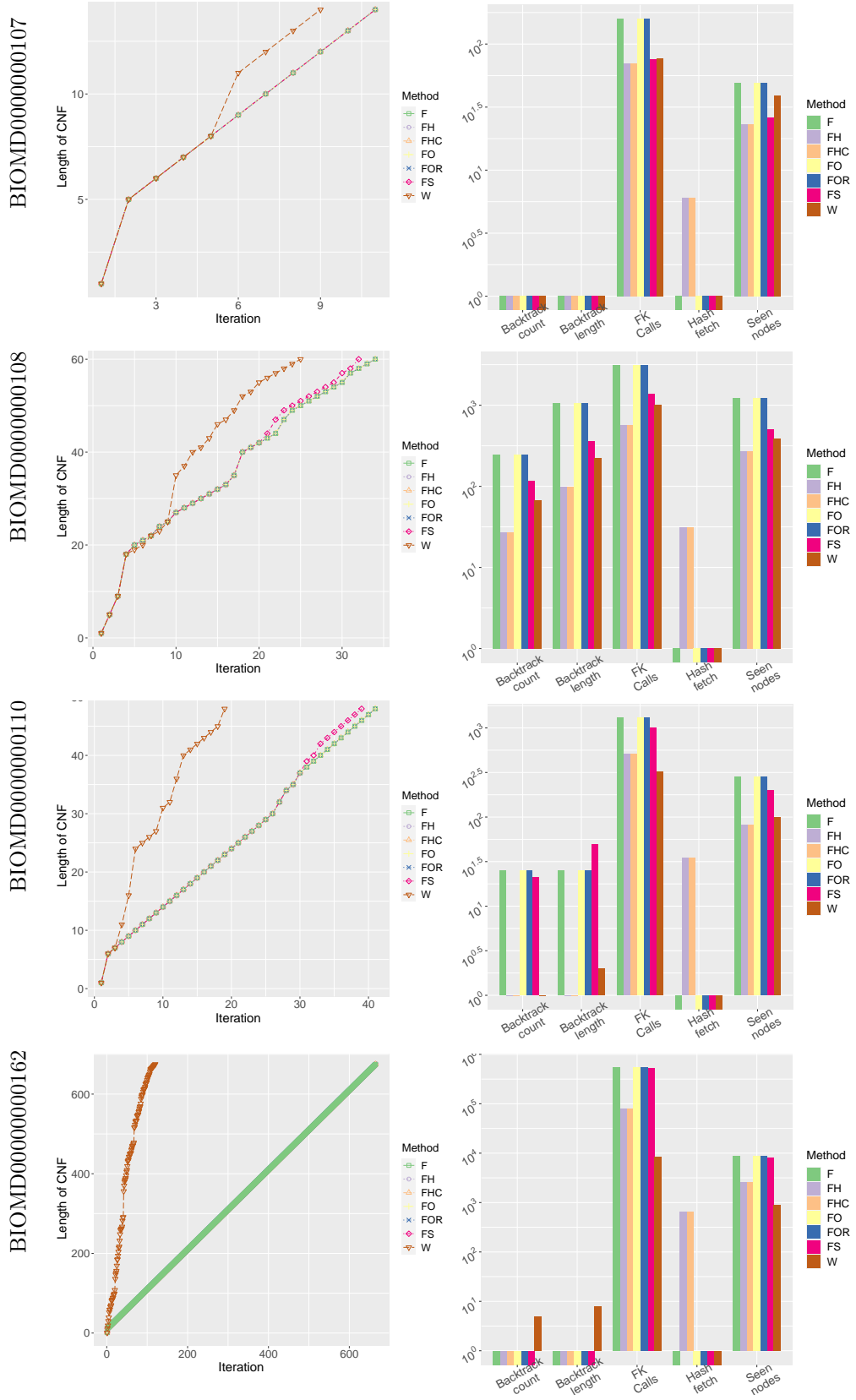


FIGURE 1. Continued.

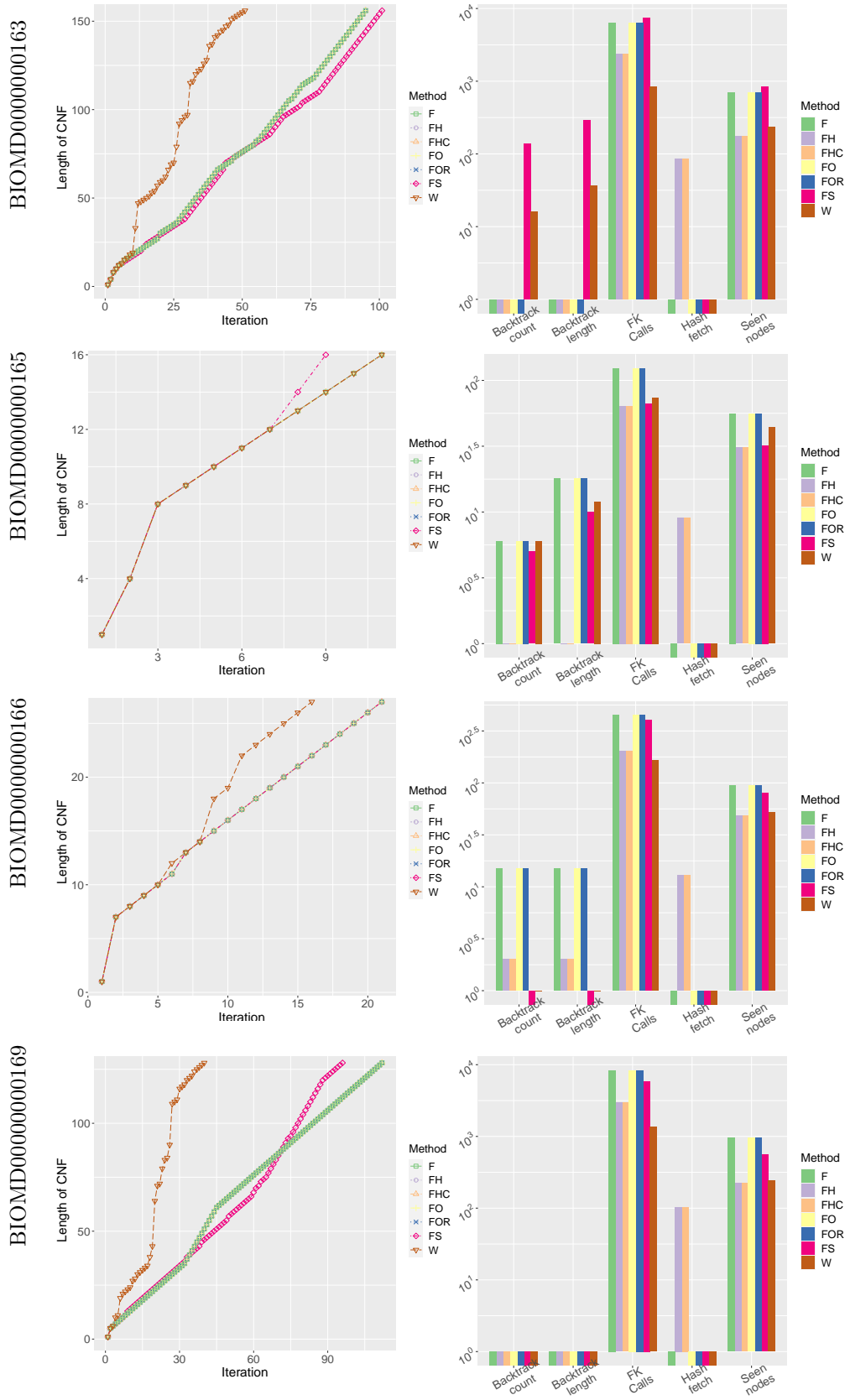


FIGURE 1. Continued.

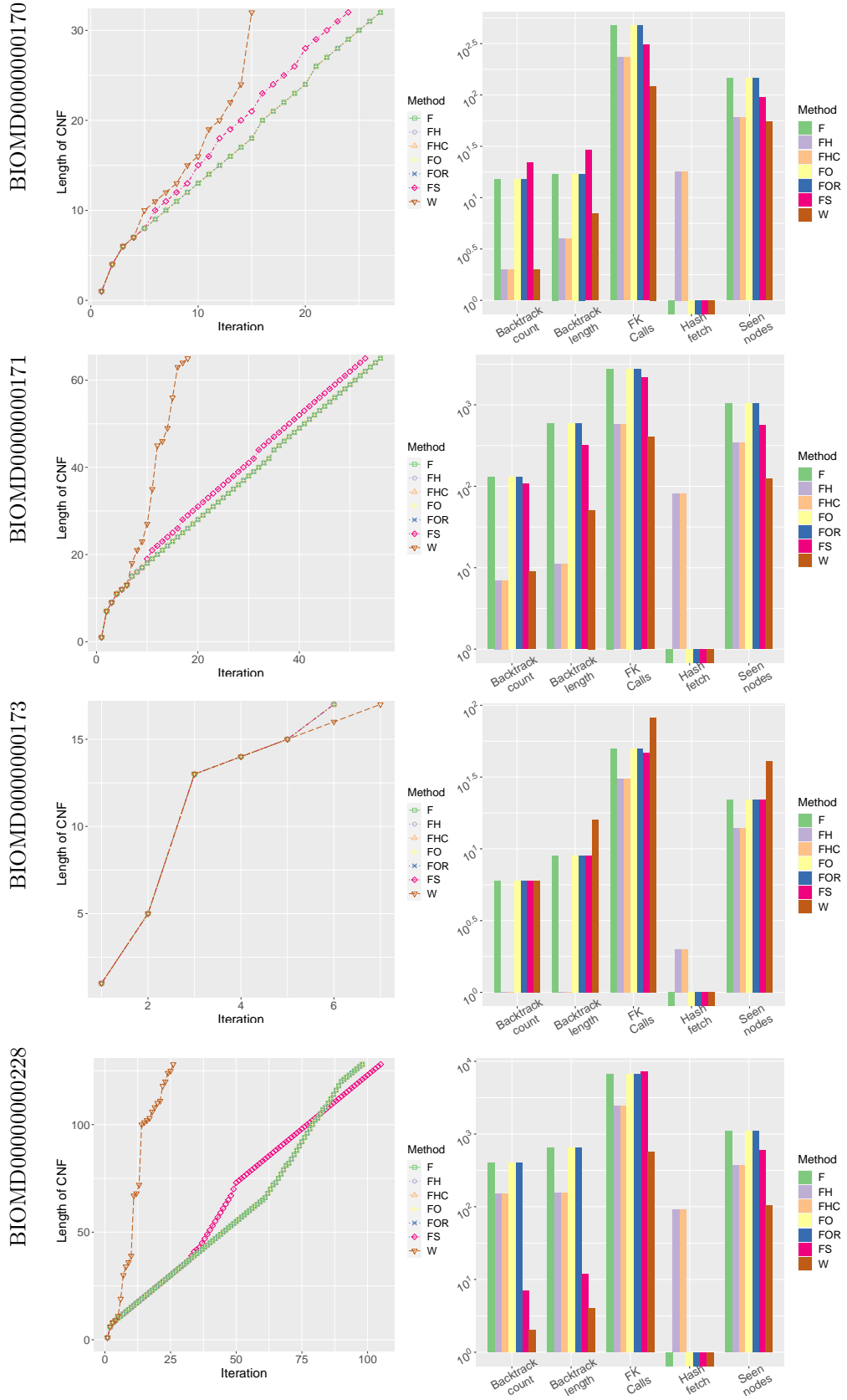


FIGURE 1. Continued.

APPENDIX B. ANALYZING REACTIONS IN THE BIOLOGICAL MODELS

Figure 2 shows the occurrence frequency of reactions in EFMs and MCSs for each model. As shown, in most of the models, occurrence frequency of reactions in the EFMs are less than the MCSs, e.g. *BIOMD0000000034* and *BIOMD0000000048*.

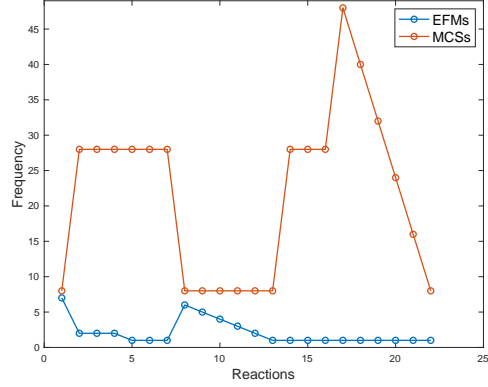
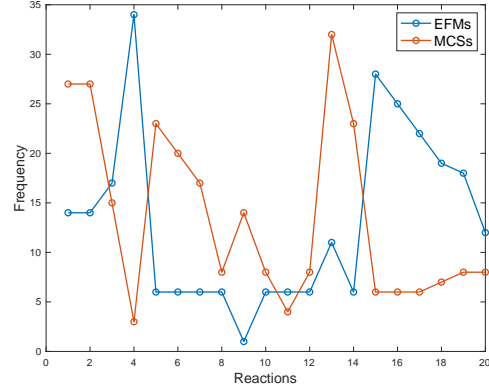
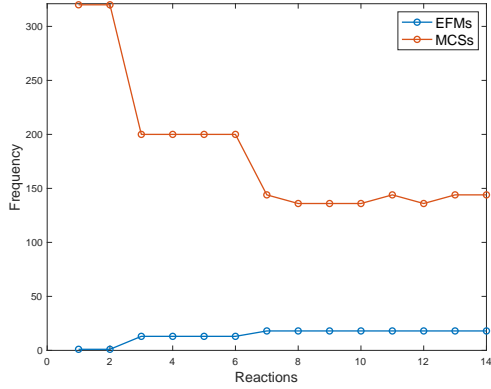
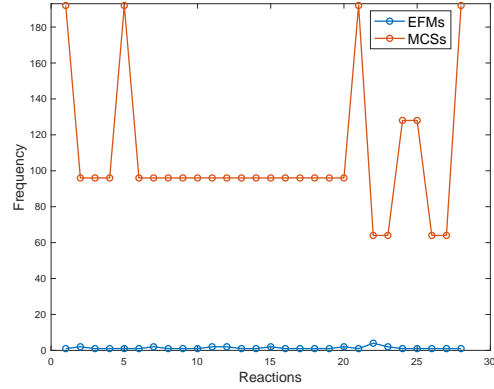
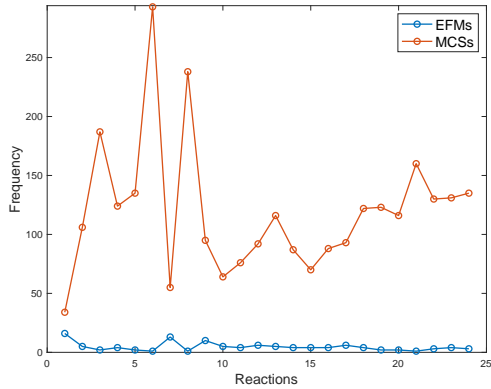
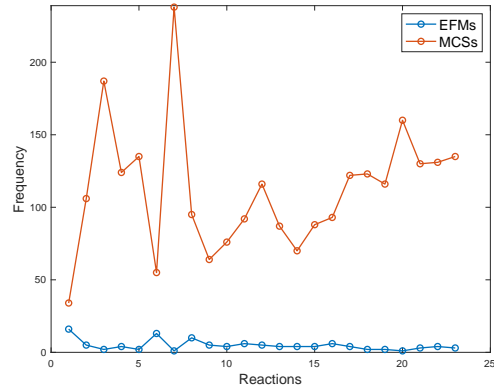
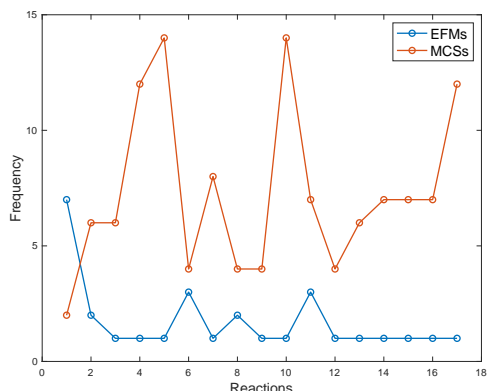
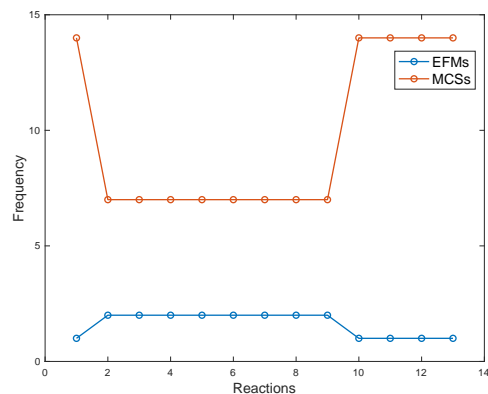
(1) *BIOMD0000000034*(2) *BIOMD0000000042*(3) *BIOMD0000000048*(4) *BIOMD0000000089*(5) *BIOMD0000000093*(6) *BIOMD0000000094*

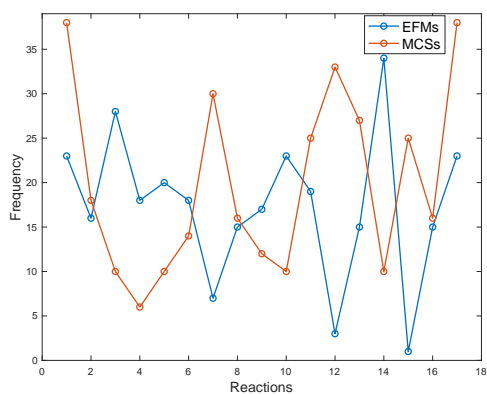
FIGURE 2. Frequency of occurrence of reactions in EFMs and MCSs.



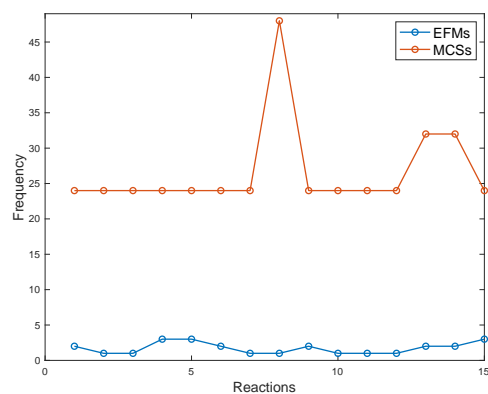
(7) BIOMD0000000106



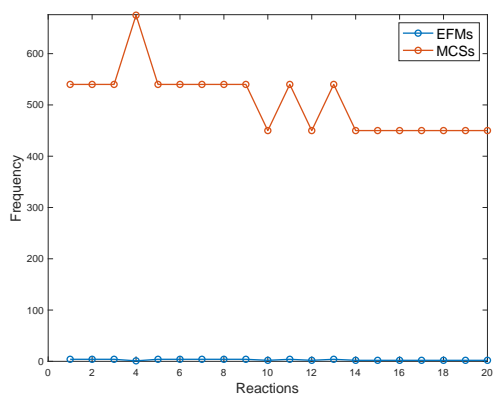
(8) BIOMD0000000107



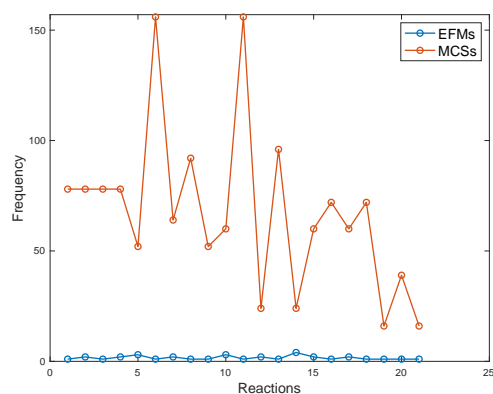
(9) BIOMD0000000108



(10) BIOMD0000000110

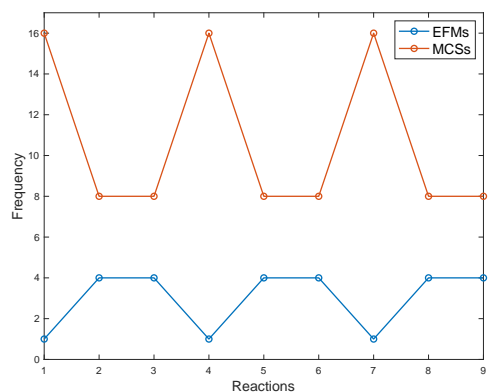


(11) BIOMD0000000162

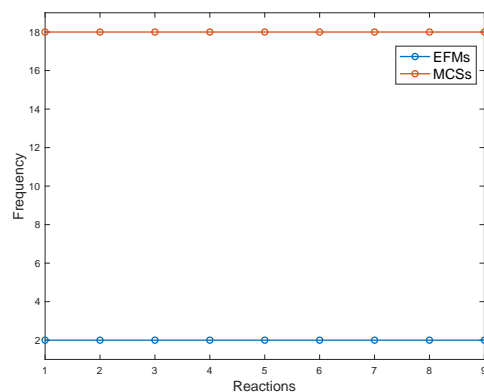


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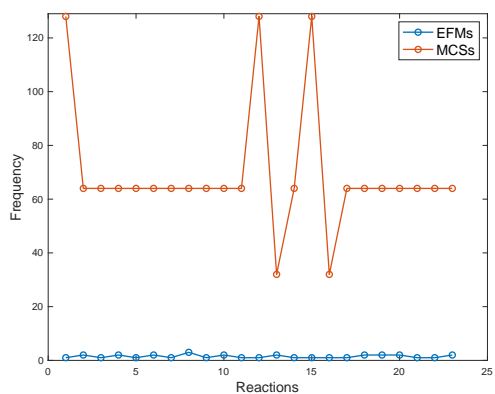
FIGURE 2. Continued.



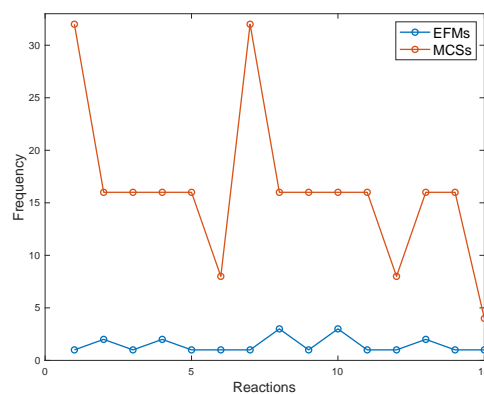
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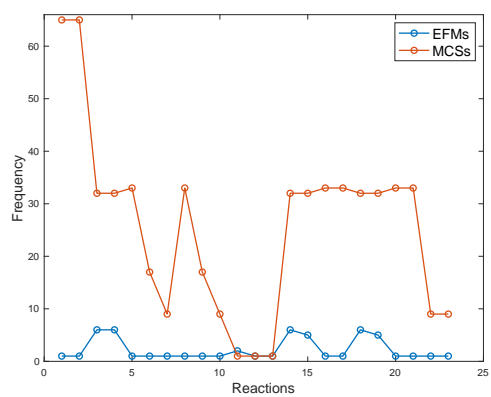
(14) BIOMD0000000166



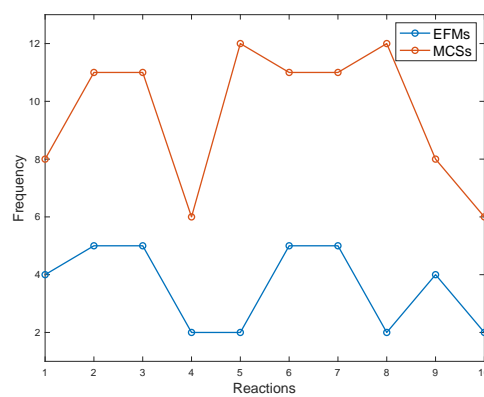
(15) BIOMD0000000169



(16) BIOMD0000000170

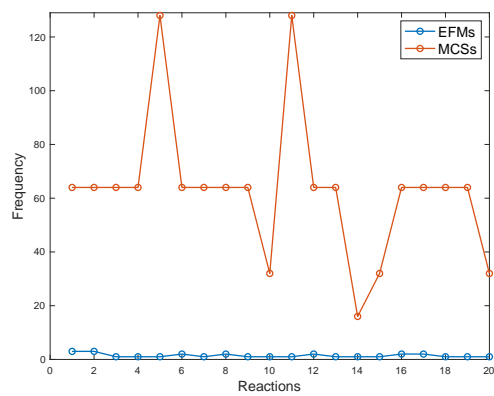


(17) BIOMD0000000171



(18) BIOMD0000000173

FIGURE 2. Continued.



(19) BIOMD0000000228

FIGURE 2. Continued.

APPENDIX C. CNF COMPLETION PROGRESS

Figure 3 demonstrates the progression of constructing CNF when FK and modified FK in the dualization procedure.

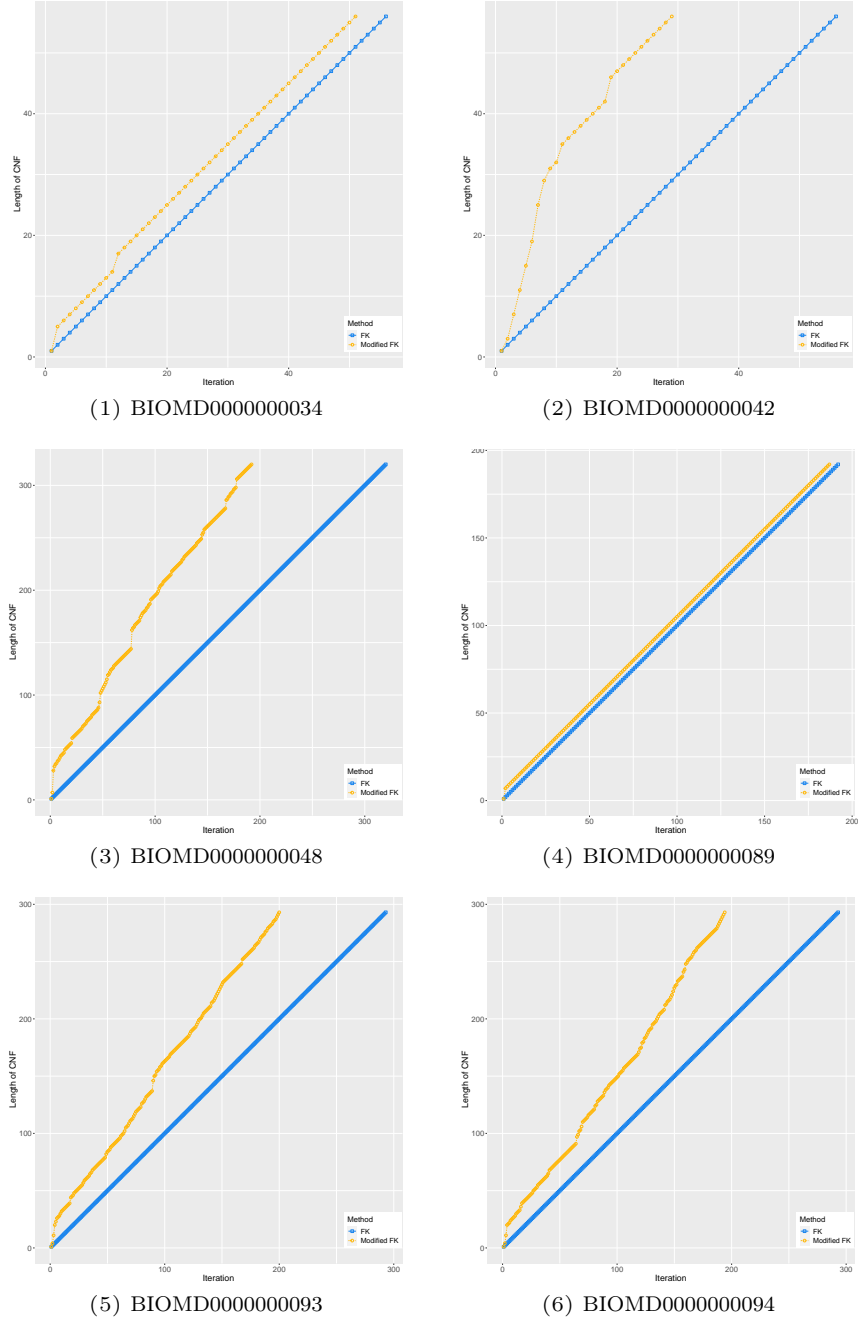
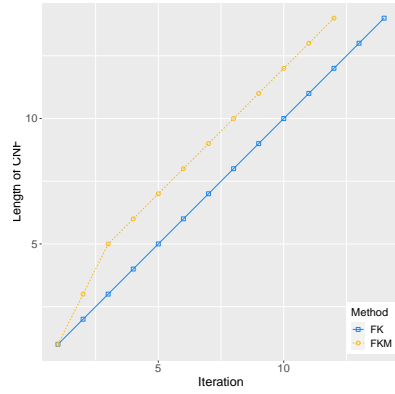
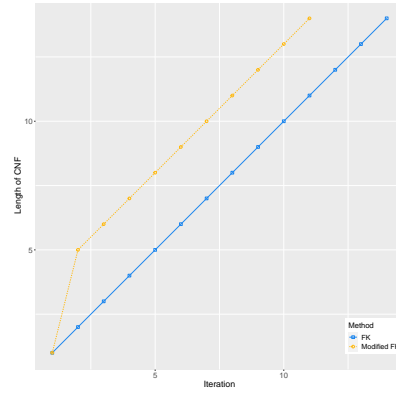


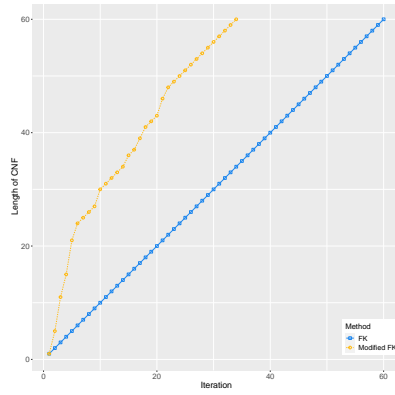
FIGURE 3. Progression of constructing CNF across FK -dualization iterations when FK and FKM have been used for equivalency check between the CNF and the DNF.



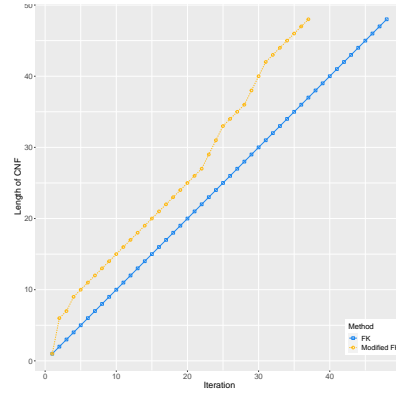
(7) BIOMD0000000106



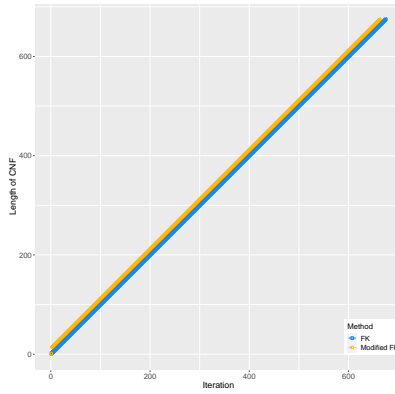
(8) BIOMD0000000107



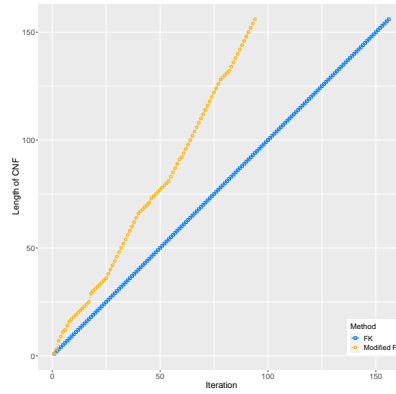
(9) BIOMD0000000108



(10) BIOMD0000000110

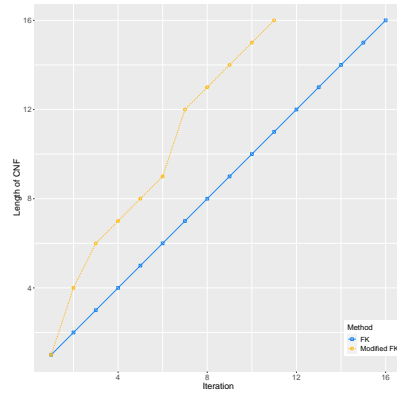


(11) BIOMD0000000162

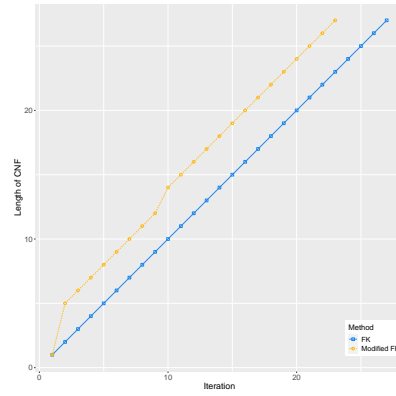


(12) BIOMD0000000163

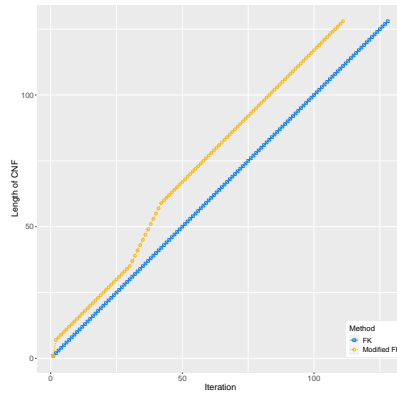
FIGURE 3. Continued.



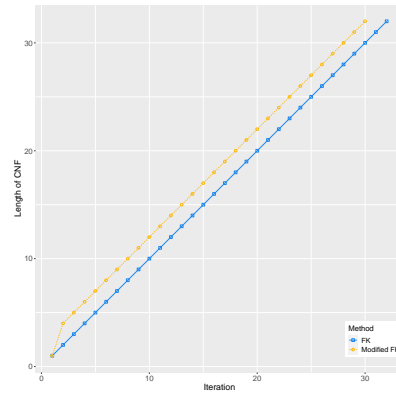
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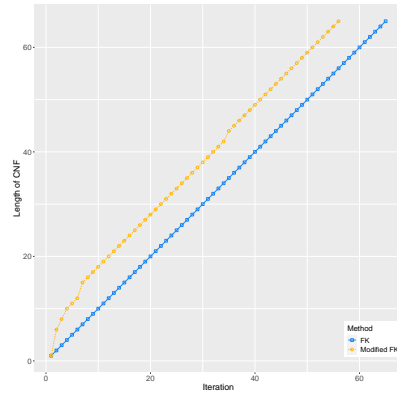
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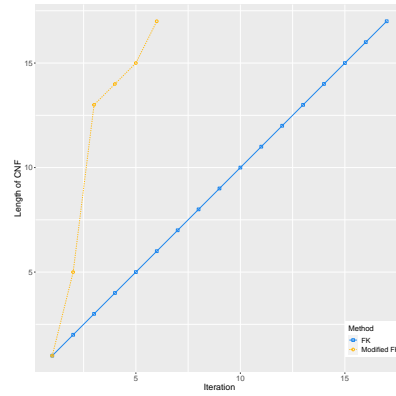
(15) BIOMD0000000169



(16) BIOMD0000000170

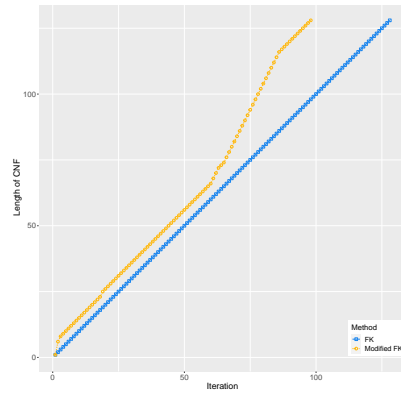


(17) BIOMD0000000171



(18) BIOMD0000000173

FIGURE 3. Continued.



(19) BIOMD0000000228

FIGURE 3. Continued.

SCHOOL OF COMPUTING SCIENCE, SIMON FRASER UNIVERSITY

Email address: `nf_sedaghat@sfu.ca`

DEPARTMENT OF MATHEMATICS, SIMON FRASER UNIVERSITY

Email address: `tamon@sfu.ca`

MRC CENTRE FOR GLOBAL INFECTIOUS DISEASE ANALYSIS, SCHOOL OF PUBLIC HEALTH, IMPERIAL COLLEGE LONDON.

Email address: `l.chindelevitch@imperial.ac.uk`