

Kinship and pedigree analysis: Methods and applications

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Solutions for exercise set VIII: DVI analysis with Diviana

Exercise VIII-1

- 8 victims, 5 missing persons, 5 families
- M2, M3 and M5 are *undisputedly* identified as V6, V2, V4, respectively, while M1 and M4 have inconclusive (but suggestive) matches to V1 and V3.
- All families are simple (only 1 missing), so no joint analysis was required.
- The previously suggestive matches $M1 = V1$ and $M4 = V3$ are now *Probable*. This happens when the LR value is below the threshold, but larger than 10% of the threshold.
- V7 and V8 are clearly related, most likely full siblings.

Exercise VIII-2

- Individual 1 is *Nonidentifiable* (since she is unrelated to the reference R1).
- We now have a *Symmetric match* in family F2, since V6 matches both M2 and M2-2 equally well.
- A and B are both *Nonidentifiable* since there are no typed reference individuals in the family.

Exercise VIII-3

- 3 victims, 3 missing persons, 1 family.
- The solution is that $V1 = M1$ ($GLR=7.06e+04$) and $\{V2, V3\}=\{M2, M3\}$ ($GLR=2.95e+06$).
- With M3 male, he is *Excluded* (since there are no male victims!), while M1 and M2 are inconclusive.
- The solution is the same as in b).

Exercise VIII-4

- 16 victims, 15 missing, 15 families
- No potential errors are indicated. The points are quite widely spread out, but the GLRs and p-values show that they are within normal variation.
- A few p-values are below 0.05, which could potentially indicate relatedness between some of the victims. However, this could be the result of multiple testing. Also none of the points suggest close relationships.
- Only 2 missing persons are identified; all the others are excluded.