

## A Note on the IPF Algorithm When the Marginal Problem is Unsolvable.

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*Abstract:* In this paper we analyze the asymptotic behavior of the IPF algorithm for the problem of finding a  $2 \times 2 \times 2$  contingency table whose pair marginals are all equal to a specified  $2 \times 2$  table, depending on a parameter. When this parameter lies below a certain threshold the marginal problem has no solution. We show that in this case the IPF has a “period three limit cycle” attracting all positive initial tables, and a bifurcation occur when the parameter crosses the threshold.

*Keywords:* contingency tables; hierarchical models; partial maximization algorithms;

*AMS Subject Classification:* 62H17; 65C60;