

Mathematical Modeling of Marriage Dynamics

Objective: To give a presentation of about 60 minutes at the end of the week covering the key aspects of modelling of marriage dynamics and give a critical discussion.

To make mathematical models that observe interactions between a married couple over a short time period and then try to predict the long term fate of the marriage is both original and audacious, but also contentious. The interactions between the couple is discretized into the contiguous sentences uttered by one partner. The partners are asked to discuss a topic – for instance “mother-in-law” and their facial expressions are monitored and measured on a scale giving a real valued variables. Thus a sequence of mood-indicators are observed $W_1, M_1, \dots, W_k, M_k, \dots$. This is the basic data that has to be modelled and conclusion about the long term trend of the marriage is to be drawn. This seems both reasonable and unreasonable. Reasonable because it is intuitive that if they interact in a way that leads to serious quarrel, it is a bad indicator for the long term stability of the marriage. Unreasonable, since most would a asset that a marriage is influenced by many other factors not measured in these observations: decision made by the partners, children, outside events etc. Nevertheless, one has to start with simple models.

The Big Questions Are:

- Is the reasonable to draw global conclusions from local observations in a marriage?
- Is the data ideal – seems major reductions have been made?
- Would it be relevant to include further observations from the marriage in a model?
- How is such data modeled. Does these models pass a goodness of fit test?
- Has similar models been used elsewhere?

Maximal Contents of Presentation

What is the data

The basic statistics of marriage stability and marriage research

The Model

Marriage repair

Conclusions for data analysis

Extensions to models

Recommended literature

Cook et al. (1995) Mathematics marital conflict J. Fam Psych. 9.110-130

Gottman and Levenson (1992) Marital Proesses Predictive of Later Dissolution. J. Pers. Soc. Psych. 2.221-33

Gottman et al. (2002) The Mathematics of Marriage

Murray, J (2002) Mathematical Biology vol. I chapt 5. Modeling he Dynamics of Marital Interaction Springer

Philips (1991) Untying the Knot: A Short History of Divorce. Canto

Strogatz SH (1998) Love affairs and differential equations. Mathematics Magazine 61: 35.