1   Introduction

We want to predict how a population will grow numerically over a few generations. Since the food supply and nature sources are limited, how the population will be in the next few generations is important for the human beings. Whether the population will eventually die out or grow to fill the universe is important for the existence of humen.

2   Problem Statement

As we mentioned above, the prediction of population is now an urgent issueto tackle. To obtain a simple model, we need to ignore time lag effects; that is, we assume that only the present value of N and its derivatives are relevant in determining the future values of N. Let the exogenous variables be the net reproduction rate r per individual, the time t, and the size of the population at t=0. The model would certainly be useful if it fits the real world. For the further step, we gonna replace the net reproduction rate by a strictly decreasing function of N, and make robust prediction with few assumptions concerning the nature of the function r(N). The sponsor currently has a limited capability to conduct such statistical research and modeling with existing data, and our task is to provide them with a statistical conclusion with reasonable assumptions.

3   Timeline

We have the following major deadlines:

- Work Statement due date, Oct 8, 2012,

- Midterm Presentation due date, Oct 12, 2012,

- Final Report due date, Nov 30, 2012.

4   Deliverable

4.1   From Team to Sponsor

The following outputs are expected from this project:

- Prediction of how population will grow numerically over a few generations

- Model-based growth rates

- Comparison between growth rates with different assumptions

- Long-term solutions for population booming

- Data package for population prediction

4.2   From Sponsor to Team

In order for our project to be of successful one, we will need:

- Historical data of population

- Computing resources

- Symposium attendance travel expenses.