**Carlos Garcia 12/19/2013**

**Prof. Z. Marantz**

**Logistic Statistics for Optimal Radio Resource Allocation**

On November 7th, I attended the presentation by Prof. Z. Marantz where he talked about the CDMA multiplexing system, which was invented by Hedy Lamarr in the 1940s. Initially used by the military, CDMA is now used in WIFI and Bluetooth technologies. In this system every user shares a resource at the same time with a code – in groups of bits with extra information to verify if the information received was correct. The purpose of the research Prof. Z. Marantz is working on deals with the optimization of this system, and in this presentation he explained how he found the optimal model -- S-function -- that describes the shape of a function. The function shown in the slides deals with the parameter called SNR, and it was shown that the noise in the system was not only random; it also included the other people in the same system who were transmitting information. With the SNR ratio it is possible for the function to know the probability of determining if information will be received – mathematically it can be determined that it is better to communicate at a power level so that the received information can be received at the same power level. The idea was to improve or maximize the amount of information being transmitted per unit energy used. By performing differentiation and rearranging the equation the volume that satisfies the function was found. In the end, it was concluded that a generic solution could be found to improve the system, and that a probability function, as well as other methods or models of solving a problem, can be used in the different disciplines. For example, a population growth function used in the field of biology can be used in the field of telecommunications to find a solution. Also, it was concluded that certain parameters, such as beta, did not affect too much the overall results, so in the end the function could be generated without these parameters; a generalized function was found to solve solutions in different systems by working backwards and determining the different parameters.