Statistics 434: Bullet Points for Day 10

Bet Sizing and Long-term Wealth Growth Rates

Today we take a little side tour from our investigation of the ARIMA(p,d,q) model to look at what the general question "Facing the possibility of a favorable bet, what fraction of one's wealth should one bet?" This question leads us to the notion of the long-term growth rate of wealth and the to the controversial Kelly criterion.

- Comments on HW3 being returned today
- Class Discussion of HW4 that is due today
- Review of the Law of Large Numbers (Strong and Weak)
- The Kelly Principle
    1. Relationship of the LLN to the long-term growth rate of wealth
    2. The Kelly Criterion for Bet Sizing
    3. A Theorem on Long-Term Wealth Growth Rate
    4. A Concrete Example: Kelly for a biased coin (exact)
    5. A Gambler's Example
    6. The General Approximation to the Kelly bet size
    7. A "Fermi Calculation" for financial assets
    8. (Optional) Kelly for Pairs of Bets
- Theoretical Controversies and Practical Mysteries
    1. Two Objections in Theory (Consumption and Utility)
    2. Two Objections in Practice
        (a) Estimation Errors
        (b) Model Misspecification Errors
    3. Opportunities for Many Useful Variations
- Relationship to the St. Petersburg Paradox

Quote of the Day

Andre Malraux once observed, "Often the difference between a successful person and a failure is not one has better abilities or ideas, but the courage that one has to bet on one's ideas, to take a calculated risk — and to act."

No one ever accused Malraux of a lack of courage. From a comfortable bourgeois perspective, he was terrifyingly reckless. Moreover, according to one biographer, Olivier Todd, Malraux suffered later in life from a genuinely medical case of Tourette's syndrome.