The Excel worksheet is a retirement planning tool that uses **Monte Carlo simulations** to model the growth of retirement savings under varying economic conditions. It incorporates key inputs such as current age, retirement age, life expectancy, salary, contribution rates, investment returns, inflation, and withdrawal rates to project the corpus required for retirement. The tool compares deterministic calculations (certainty cash flow) with probabilistic Monte Carlo simulations to provide a range of potential outcomes.  
  
**Key Components of the Worksheet**

1. **Input Parameters**:
   * Personal details (current age, retirement age, life expectancy).
   * Financial assumptions (interest rates before/after retirement, inflation, salary growth, withdrawal rates).
   * Current savings, monthly contributions, and employer matches.
2. **Deterministic Calculations**:
   * Projects retirement corpus using fixed assumptions (e.g., FIRE rules like 25X or 33X annual expenses).
   * Uses present/future value formulas to estimate required savings.
3. **Monte Carlo Simulations**:
   * Simulates 5 thousand scenarios with randomised returns and inflation rates (normally distributed around user-defined averages).
   * Tracks annual savings growth, withdrawals, and end balances to estimate the probability of success (not outliving savings).

**Advantages of Monte Carlo Simulations**

* **Real-World Variability**: Accounts for fluctuating market returns and inflation, unlike static models.
* **Risk Assessment**: Reveals the likelihood of success or failure under various conditions.
* **Flexibility**: It adjusts for changing contributions, lifespan, or economic scenarios.
* **Visualization**: Helps users understand the range of possible outcomes (e.g., "best case" vs. "worst case").

**Disadvantages**

* **Complexity**: Requires robust modelling and understanding of statistical assumptions (e.g., normal distribution of returns).
* **Garbage In, Garbage Out**: Accuracy depends on input assumptions (e.g., if return distributions are misestimated, results will be skewed).
* **Overwhelming Outputs**: These may confuse users with too many scenarios or percentiles.
* **Black Swan Risks**: Rare extreme events (e.g., market crashes) may not be fully captured.

**Conclusion**

Monte Carlo simulations enhance retirement planning by incorporating uncertainty, offering a more realistic view than deterministic models. However, they require careful input calibration and interpretation. Users should combine these insights with conservative assumptions (e.g., higher savings rates, lower withdrawal rates) to mitigate risks.