1   MC_final_distribution_cliquet.py

Purpose

Simulates and compares the distribution of final payoffs from:

- A **vanilla call option** (single payoff at maturity).

- A **cliquet option** (series of periodic resets, each with local caps/floors, plus a global cap/floor on the sum).

Learning focus

- **Vanilla call** payoff depends only on the final spot price at maturity.

- **Cliquet option** accumulates gains/losses period by period, applying:

    o **Local caps/floors** to limit each period's return.

    o **Global caps/floors** to limit the total payoff over the life of the option.

- This structure smooths performance — extreme gains are cut, but extreme losses can be softened.

Key intuition

Cliquet options appeal to investors seeking equity-linked returns with downside protection and limited upside. In bull markets, the cap limits gains compared to a vanilla call; in volatile or bearish markets, the floor helps avoid large losses.

Experiment

Increase local_cap from 0.05 to 0.10 and re-run — you'll see the cliquet payoff distribution shift closer to the vanilla call's distribution, as more upside per period is allowed.

2   Cumulative_payoff_with_without_floor.py

Purpose

Shows step-by-step how cumulative returns evolve **with** and **without** caps/floors across multiple periods.

Learning focus

- Breaks the option's life into discrete periods (e.g., years).

- Compares **raw returns** to **capped/floored returns** each period.

- Demonstrates the compounding effect — caps reduce large gains, floors prevent steep drops.

- Graphically shows how the capped/floored cumulative return path diverges from the raw return path.

Key intuition

For structured products, this is how a "cliquet payoff" is built. Over several years, the cap acts like a ceiling on your growth, and the floor acts like insurance against bad years. This trade-off is the reason cliquets often have lower premiums than uncapped equity exposure.

Experiment

Set cap to 0.15 and floor to 0.00 to simulate a product with higher upside allowance but no downside protection. Compare the cumulative return charts — you'll see the effect on both volatility and total return.