Position Management Formulas

Liquidation Price Formula

The correct formula for calculating the liquidation price is:

```
P_safe = P_avg × (1 - 0.90 × (M/V))
```

Where:
- `P_safe` = Liquidation price (double-up signal)
- `P_avg` = Average entry price
- `M` = Total margin/investment (in USDT)
- `V` = Total position value with leverage (in USDT)
- `0.90` = Safety factor (90% of the margin is used as the threshold)

Take Profit Formula

The take profit price is calculated using:

```
P_tp = P_avg × (1 + (0.5 × M/V))
```

Where:
- `P_tp` = Take profit price
- `P_avg` = Average entry price
- `M` = Total margin/investment (in USDT)
- `V` = Total position value with leverage (in USDT)
- `0.5` = 50% profit target

Position Calculation Examples

Example 1: BTC-USDT Position (Formula Application)

Using the exact example from the reference:

Final State Example:
- Average Entry Price (P_avg): 105604 USDT
- Total Margin (M): 3500 USDT
- Total Position Value (V): 30000 USDT

Liquidation Price Calculation:

```
 P_safe = 105604 × (1 - 0.90 × (3500/30000))
P_safe = 105604 × (1 - 0.90 × 0.1167)
P_safe = 105604 × (1 - 0.105)
P_safe = 105604 × 0.895
P_safe = 94517 USDT
```

Double-Up Strategy:

If BTC hits $94,517, you should add another position (double up), not wait until $93,750 (the actual liquidation).

Take Profit Calculation:

```
 P_tp = 105604 × (1 + (0.5 × 3500/30000))
P_tp = 105604 × (1 + (0.5 × 0.1167))
P_tp = 105604 × (1 + 0.0583)
P_tp = 105604 × 1.0583
P_tp = 111761 USDT
```

Example 2: ETH-USDT Position (Practical Application)

Initial Position:

- Entry Price: $3,000
- Initial Investment: 500 USDT @ 20X leverage
- Liquidation Price: $2,850.50 (4.95% drop)
- Double Threshold: $2,865 (4.5% drop)

First Double:

- Additional Investment: +1000 USDT @ 10X leverage
- New Total Investment: 1500 USDT
- New Liquidation Price: Recalculated based on combined position

Second Double:

- Additional Investment: +2000 USDT @ 5X leverage
- New Total Investment: 3500 USDT
- New Liquidation Price: Recalculated based on combined position

Take Profit Target:

- Final Target: $3,250 (50% profit on $3,500 total investment)

Implementation Notes

1. After each doubling, recalculate:
2. New average entry price (`P_avg`)
3. New total margin (`M`)
4. New total position value with leverage (`V`)
5. New liquidation price (`P_safe`)

6. New take profit price (`P_tp`)

7. The liquidation price is not simply a percentage of the entry price, but depends on the ratio of margin to total position value.

8. The double-up signal should be set at the calculated `P_safe`, not at the actual liquidation price.