

# FINCAD Python Deep-dive: Documentation

Fixed Income, Derivative & Risk Analytics Framework

With FINCAD Python, our guiding principles are: Simplicity, Power, and Support. In this document we will be focusing on the last of these, Support, and specifically the product documentation, which is example focused, and updated continuously, as new functionality is added.

**SIMPLICITY**

**POWER**

**SUPPORT**

With FINCAD, you can have utmost confidence in the models underlying your valuation and risk. Each of our products and services offer comprehensive documentation explaining all system features, configuration, and integrations, with specific syntax and examples. Below are examples of a new user referring to the User Guide for help.

## Example 1: User is looking to value an Interest Rate Swap:

Within the User Guide, help is available:

<b>Instruments and Valuation</b> See asset-class specific valuations and typical pricing workflows.	<b>Model Configuration</b> See how to configure your valuation environments and pricers.	<b>Integration</b> See how Market Data, Trades and Reference data can be integrated.
<b>Applications</b> See how to run scenarios, run portfolio-level analysis such as XVA, and much more.	<b>Utilities</b> See how best to plot curves, manipulate our data frames and use our debugging tools.	<b>Cloud Services</b> Examples of how to use FINCAD cloud services

Check the documentation available for this instrument type:

<b>Swaps</b> How to set up swaps
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Further detail is available on this instrument type, including cash flow analysis, sensitivity analysis, as well as configuration options. Detail is available on how to submit the trade, including an example.

**Swaps**

This notebook illustrates how to value swaps.

```
[2]: from fincad.analytics.core.instruments import interest_rates
from fincad.analytics.core.ref_data import indices
```

Form the swap instrument:

```
[3]: swap_instrument = interest_rates.FixFloatSwap(
    notional="10Mio", floating_rate_index=indices.LiborUSD3m, maturity="2y", fixed_coupon=0.015
)
```

By default, the floating rate index is used to identify the market standard conventions for the instrument. For example, the most actively traded dollar swap for Libor pays semi-annual fixed and measures accrual to `FixFloatSwap`.

Next, enter into a swap paying fixed. By default, the swap is entered as a swap paying fixed.

```
[4]: swap = swap_instrument.enter()
result = swap.calculate()
```

Run the calculate method on the resulting instrument.

```
[5]: result.value
```

All valuations provide the present value, cash flows, and sensitivities. A swap can provide additional information, including par coupon and Price Value of a Basis Point (PVPB/PVBI):

```
[5]: 225,581.78 USD
```

**Example 2:** After becoming familiar with Interest Rates Swaps and other instrument types, the user would like to construct a portfolio, rather than a single trade:

Portfolio documentation:

**Portfolios**

Valuations and risk metrics on the portfolio level.

Example portfolio construction using equities:

**Create a portfolio**

Use intuitive binary operations for construction.

```
[4]: portfolio = sum(positions)
assert portfolio == position_0 + position_1 + position_2
assert portfolio.positions == positions
assert portfolio.trades == []
```

Use `.to_dataframe()` for convenient dataframe representation.

```
[5]: df = portfolio.to_dataframe()
df
```

Position	Type	ID	Description
0	Equity	AppleIncUSD100Long	Equity[AppleInc]USD100Long
1	Equity	TeslaMotorsIncUSD75Long	Equity[TeslaMotorsInc]USD75Long
2	Equity	JPMorganChaseUSD100Long	Equity[JPMorganChase]USD100Long

```
[6]: portfolio = sum(positions)
assert portfolio == position_0 + position_1 + position_2
assert portfolio.positions == positions
assert portfolio.trades == []
```

The above portfolio exists and is now ready to be submitted for any calculations.

### Example 3: Jumping into more advanced usage, the user would now like to run a Forward Valuation Scenario on a swap, to see its value as-of a future date, all else equal:

**Standard Scenarios**  
An introduction to applying scenarios to a valuation.

One type of Scenario Analysis: Forward Valuation

**Forward Valuation Scenario**

The `ForwardValuationScenario` performs a valuation as of a future point in time.

```
[23]: fwd_val_scenario = scenarios.ForwardValuationScenario(datetime.date(2022, 1, 1))
```

```
[24]: with fwd_val_scenario:
      fwd_val_scenario_result = swap_trade.calculate()
```

```
[25]: fwd_val_df = fwd_val_scenario_result.cashflows.to_dataframe()
      fwd_val_df
```

	PaymentDate	PaymentCurrency	CashflowAmount	Notional	AccrualFraction	ImpliedAmount	IsFixedFlow	PayRecBuyf
0	2022-07-29	USD	74583.333333	10000000.0	0.497222	0.015000	True	
1	2023-01-31	USD	75833.333333	10000000.0	0.505556	0.015000	True	
2	2023-07-31	USD	75000.000000	10000000.0	0.500000	0.015000	True	
3	2024-01-31	USD	75000.000000	10000000.0	0.500000	0.015000	True	
4	2022-04-29	USD	-15915.216006	10000000.0	0.244444	0.006511	False	f
5	2022-07-29							
6	2022-07-29							
7	2022-07-29							
8	2023-01-31							
9	2023-07-31							
10	2024-01-31							
11	2024-07-31							
12	2022-07-29							

```
[26]: fwd_val_scenario_result.value
```

```
[26]: 225,367.26 USD
```

More complex scenario analysis is available, including user-defined market data shocks.

## Solve complex derivative analytics challenges with unparalleled simplicity

Users are able to quickly come up to speed with FINCAD Python, allowing them to build their ideal processes, all within Python and with easy integration to other applications and data.

This documentation is backed up by a full support team available for queries and help. Additionally, FINCAD Professional Services will guide users in a thorough onboarding process and hands-on training sessions.



Discover what sets FINCAD documentation apart.

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