Project 2

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1 Credit Curve Bootstrapper

The goal of the project is to build a bootstrapping procedure whose output will be a credit curve (an instance of the Python class CreditCurve). The input parameters to derive this curve are:

- The par rate of a set of Overnight Index Swaps (i.e. their market quotations)
- The par rate of a set of Credit Default Swap (i.e. their market quotations)

The resulting class will be used to compute the market value of a set of custom CDS.

Numerical results must be presented to the examining committee during a presentation in which the candidates will also explain the theoretical framework for CDS evaluation.

[2]:
```
from datetime import date
```

[11]:
```
pricing_date = date(2019, 10, 31)
```

[12]:
```
cds_recovery = 0.4
```

[13]:
```
cds_quotes = [
    {'maturity': 12, 'spread':0.0149},
    {'maturity': 24, 'spread':0.0165},
    {'maturity': 36, 'spread':0.0173},
    {'maturity': 69, 'spread':0.0182},
    {'maturity': 120, 'spread':0.0183},
    {'maturity': 240, 'spread':0.0184},
]
```

[14]:
```
ois_quotes = [
    {'maturity': 1, 'rate': 0.00106},
    {'maturity': 2, 'rate': 0.00114},
    {'maturity': 3, 'rate': 0.00115},
    {'maturity': 4, 'rate': 0.00117},
    {'maturity': 5, 'rate': 0.00119},
    {'maturity': 6, 'rate': 0.00121},
    {'maturity': 7, 'rate': 0.00122},
    {'maturity': 8, 'rate': 0.00124},
    {'maturity': 9, 'rate': 0.00128},
    {'maturity': 10, 'rate': 0.00131},
```

```
    {'maturity': 11, 'rate': 0.00135},
    {'maturity': 12, 'rate': 0.00138},
    {'maturity': 15, 'rate': 0.00152},
    {'maturity': 18, 'rate': 0.00166},
    {'maturity': 21, 'rate': 0.00184},
    {'maturity': 24, 'rate': 0.00206},
    {'maturity': 36, 'rate': 0.00344},
    {'maturity': 48, 'rate': 0.00543},
    {'maturity': 60, 'rate': 0.00756},
    {'maturity': 72, 'rate': 0.00967},
    {'maturity': 84, 'rate': 0.01162},
    {'maturity': 96, 'rate': 0.0134},
    {'maturity': 108, 'rate': 0.01502},
    {'maturity': 120, 'rate': 0.01649},
    {'maturity': 132, 'rate': 0.01776},
    {'maturity': 144, 'rate': 0.01888},
    {'maturity': 180, 'rate': 0.02137},
    {'maturity': 240, 'rate': 0.02322},
    {'maturity': 300, 'rate': 0.02389},
    {'maturity': 360, 'rate': 0.02416},
]
```

[15]:
```
cds_to_price = [
    {'nominal': 5000000, 'maturity': 18, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 21, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 30, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 33, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 42, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 45, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 54, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 72, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 84, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 96, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 108, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 132, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 160, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 184, 'spread': 0.02},
    {'nominal': 5000000, 'maturity': 210, 'spread': 0.02},
]
```