Financial Computing 2020 Spring HW1

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Introduction

To compute the $Modified\ Duration$ and $Convexity$, we can use the following formula to find it.

$$PV = \sum_{i=1}^{n} \frac{C_i}{(1+y_i)^i}$$

$$Modified\ Duration = -\frac{\partial P}{\partial y}\frac{1}{P} = -\sum_{i=1}^{n} \frac{C_i}{(1+y_i)^{i+1}}(-i)$$

$$Convexity = \frac{\partial^2 P}{\partial y_i^2} = \sum_{i=1}^{n} \frac{C_i}{(1+y_i)^{i+2}}(-i)(-i-1)$$

How to run

I use $python3$ to accomplish this assignment.

```
pip3 install -r requirement.txt
python3 hw1.py (then input the spot rate and cash flow respectively)
```

Example:

```
python3 hw1.py
0.053, 0.051, 0.049, 0.047, 0.040
3, 2, 3, 2, 103
```

Output:

```
Modified Duration: 4.562384213864675
Convexity:         0.2587936757475601
```