

```

1  import numpy as np
2
3  salary = 48000
4  raise_mean = .027
5  raise_std = .004
6  age_current = 24
7  age_retire = 60
8  emp_contribution = .12
9  match = .5
10
11  return_wghts = { 'a': .5,
12                  'b': .25,
13                  'c': .25
14                  }
15  return_means = { 'a': .0663,
16                  'b': .0989,
17                  'c': .0855
18                  }
19  return_stds = { 'a': .1346,
20                 'b': .1528,
21                 'c': .1690
22                 }
23  fund_values = { 'a': 0,
24                  'b': 0,
25                  'c': 0
26                  }
27
28  salaries = []
29
30  def calc_contribution_return(fund_values, contribution, fund):
31      contribution_part = return_wghts[fund] * contribution/12
32      fund_return = np.random.normal(loc=return_means[fund], scale=return_stds[fund])
33      print('\t\tfund {} return: {}'.format(fund, fund_return))
34      annuitized = contribution_part*((1 + (fund_return/12))**(12))-1)/(fund_return/12)
35      return fund_values[fund]*(1+fund_return) + annuitized
36
37
38
39  for i in range(age_current, age_retire):
40      print('age: {}'.format(i))
41      year_contribution = salary * (emp_contribution * (1+match))
42
43      for fund in fund_values.keys():
44          fund_values[fund] = calc_contribution_return(fund_values, year_contribution,
45                                                       fund)
46
47      raise_pct = np.random.normal(loc=raise_mean, scale=raise_std)
48      salary = salary * (1+raise_pct)
49      salaries.append(salary)
50
51      print('\tsalary: {}\n\tcontribution: {}\n\tnew act value: {}'.format(salary,
52                                                                           year_contribution, sum(fund_values.values())))
53

```