Answer on Question #85513 – Math – Linear Algebra

Question

An investor wants to invest $30,000 in corporate bonds that are rated AAA, A, and B.

The lower rated ones pay higher interest, but pose a higher risk as well.

The average yield is 5% on AAA, 6% on A bonds, and 10% on B bonds.

Being conservative, the investor wants to have twice as much in AAA bonds as in B bonds.

How much should she invest in each type of bond to have an interest income of $2000?

Solution

Let a, b, c be the amount of investments in corporate bonds with ratings AAA, A, B respectively.

Then, according to the task description, we have the next system of equations:

1. Total investment is $30,000:
$$a + b + c = 30000$$
2. Investment in AAA bonds must be two times bigger than investment in B bonds:
$$a = 2 * c$$
3. Total interest income is $2000 (and average yield is 5% on AAA, 6% on A, and 10% on B):
$$0.05 * a + 0.06 * b + 0.1 * c = 2000$$

$$\begin{cases} a + b + c = 30000 \\ a = 2 * c \\ 0.05 * a + 0.06 * b + 0.1 * c = 2000 \end{cases}$$

Solving this system of equations:

$$2 * c + b + c = 30000$$

$$b = 30000 - 3 * c$$

$$0.05 * (2 * c) + 0.06 * (30000 - 3 * c) + 0.1 * c = 2000$$

$$0.1 * c + 1800 - 0.18 * c + 0.1 * c = 2000$$

$$0.02 * c = 200$$

$$c = 10000$$

$$a = 2 * c = 20000$$

$$b = 30000 - 3 * c = 30000 - 30000 = 0$$

Answer: Investor should invest $20,000 in AAA bonds, nothing in A bonds and $10,000 in B bonds to have the interest income of $2000.