Essay

[Name of the Writer]

[Name of the Institution]

**PA1**

**Introduction**

**FV of multiple cash flow**

Evaluating the multiple cash flows future value elaborate that a business is doing more than one investment/payment and they want to evaluate the accumulated FV at a specific time period. Payments are having different amounts, transect at different point of time, earn different rates of interest but they will have specific future value at a specific period of time (Gan & Valdez 2017).

Once transactions are done the first step is to know about the FV of the cashflow. FV formula used to find the value of money at a specific point of time.

$FV=PV(1+i)^{2}$

It is a tedious process to calculate each cashflow of FV and then summing them together. Irregular cash flows which don't happen at a regular interval or earn various rates of interest have no other singular way to find their FV. Moreover, if cash flows occur at regular intervals, having the same interest rate and size, have easy ways to find FV. Three trait investments are called "annuities". FV of an annuity formula depends upon some characteristics, like if the payment happens at the beginning or end of each period (Brown, Kapteyn, Luttmer & Mitchell 2017). To calculate FV of annuities there is a special module which is used to find it. It is easy to find multiple cash flow if it is a part of an annuity and the only way to find it is summing the future value of cash flows which are irregular at a different time (Hejazi, & Jackson, 2016).

**PV of multiple cash flow**

Accumulation of every present value of cash flow is called PV of multiple cash flows. It is very similar to the logic of FV of multiple cash flows. Its equation is as follows;



The present value of an investment is the accumulation of the present values of all its payments. Every cash flow must be discounted at a specific point time period (Horneff, 2015). For example includes, if one loan starts at 2012 and other starts at 2014 we can't find the sum of PV of two loans if we need to find the PV we discount the second loan for further two years. If the cash flow is related to annuity it is marked as more simple.

Cash has three traits to be an annuity which includes

1. Constant size of the payment
2. Payments happen at fixed intervals
3. Interest rate is constant

**Example**

If there are numerous annuities sometimes things get messy, and before the beginning of the payments, we are required to discount them to date. To find annuities, suppose we have two sets of cash flows. The first cashflow is from 1-1-2014 to1-1-2016 and the second is from 1-1-2015 to 1-1-2017. We will evaluate the present value of all the cash flows as on 1-1-2013. The annuity equations are appropriate to evaluate the present value at the specific date of the annuity inception. It shows it is not sufficient to simply increase in the size of payments, rate of interest and number of time periods at the end of annuities between 1-1-2013. It is supposed that both annuities start on 1-1-201. In spite of, the PV of the first annuity on 1-1-2014 will be evaluated first and the second will be evaluated on 1-1-2015 because they have begun at different point of time.

 Now we have two PV which are both in the future. Then we can discount this PV as they are the accumulated to 1-1-2013. Moreover, if cash flow does not satisfy the features of an annuity then there is no way to find the PV of multiple cash flows. It is the requirement of annuity that all the PV first discounted and then they must be summed up together (Steinorth & Mitchell, 2015).

**References**

Brown, J. R., Kapteyn, A., Luttmer, E. F., & Mitchell, O. S. (2017). Cognitive constraints on valuing annuities. *Journal of the European Economic Association*, *15*(2), 429-462.

Gan, G., & Valdez, E. A. (2017). Modeling partial greeks of variable annuities with dependence. *Insurance: Mathematics and Economics*, *76*, 118-134.

Hejazi, S. A., & Jackson, K. R. (2016). A neural network approach to efficient valuation of large portfolios of variable annuities. *Insurance: Mathematics and Economics*, *70*, 169-181.

Horneff, V., Maurer, R., Mitchell, O. S., & Rogalla, R. (2015). Optimal life cycle portfolio choice with variable annuities offering liquidity and investment downside protection. *Insurance: Mathematics and Economics*, *63*, 91-107.

Steinorth, P., & Mitchell, O. S. (2015). Valuing variable annuities with guaranteed minimum lifetime withdrawal benefits. *Insurance: Mathematics and Economics*, *64*, 246-258.