hp calculators

HP 17bII+ Cash flow analysis – Other measures

Cash flow analysis

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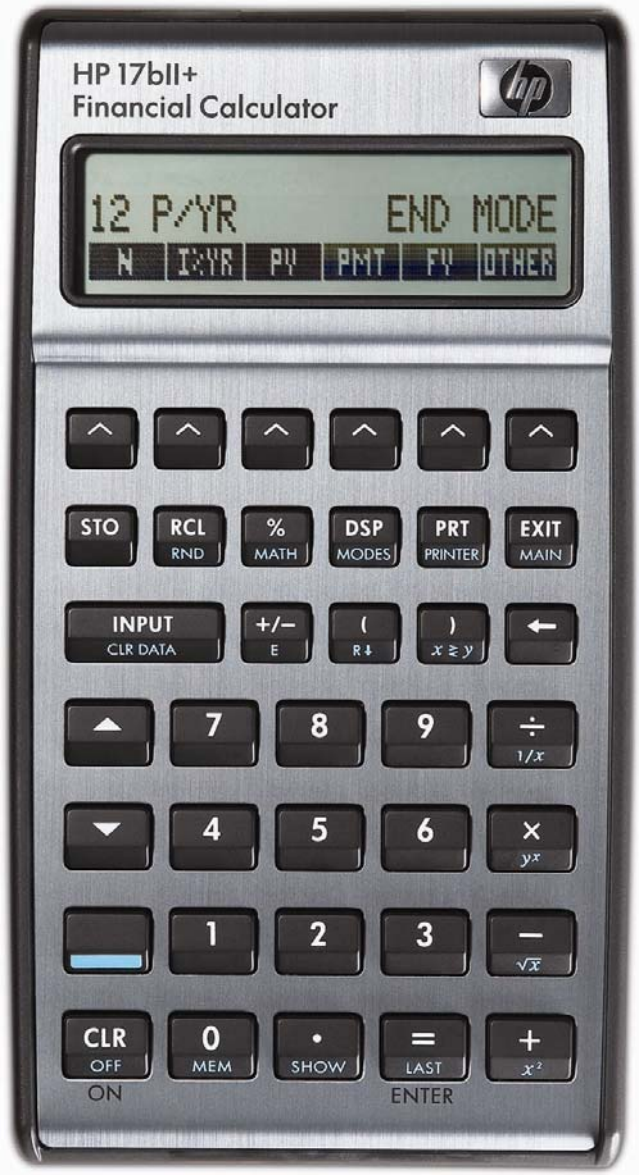


Cash flow analysis

There are times when a financial problem has either irregular or unequal payments. Since the time value of money application is not designed for these situations, the HP 17bII+ contains functions that solve these types of problems, commonly referred to as cash flow (CFLO) analysis.

As usually presented, CFLO problems have an initial negative cash flow followed by several positive cash flows. This might occur when a company is evaluating the purchase of a new machine. There would be an initial cash outlay to pay for the machine and then (hopefully) several periods of positive cash inflow as the result of the acquisition. Cash outflows are considered negative while inflows are considered positive.

CFLO problems routinely occur within financial applications such as capital budgeting, but the functionality built into the HP 17bII+ calculator is more flexible, allowing for the more general analysis of uneven and irregular payment situations.

Net Future Value, Net Uniform Series, and Total

The Net Future Value (NFV) is defined as the future value of future cash inflows net of the initial cash outflow. This amount is equal to the Net Present Value moved to the other end of the cash flow period. If this result is positive, then this is the amount in dollars at the end of the cash flow period by which the inflows exceed the outflows – it will be the amount of incremental benefit for entering into the transaction, viewed at that time. If this result is negative, then this is the amount by which the outflows exceed the inflows – it will be the amount of incremental cost for entering into the transaction. The future value is found using an interest rate representing the cost of funds involved.

Net Uniform Series (NUS) computes the periodic cash flow amount over the cash flow time period that would be equal to the NPV. If the NPV were $1000 for a 10 year cash flow time period, the NUS might be $170 a year over the 10 year period. This can be particularly useful when comparing alternatives that have differing economic lifetimes. If the decision would be repeated indefinitely, it is possible that an alternative with a longer economic lifetime for one choice might have a higher NPV, yet not generate an annual benefit as high as a lower NPV alternative with a shorter economic lifetime. This measure is sometimes called Equivalent Annual Benefit or Equivalent Annual Annuity. Note that this measure is useful when comparing alternatives only when the choices would be repeated indefinitely.

Total simply computes the total of all cash flows, positive or negative. It sums all the entered cash flows.

Entering cash flows

On the HP 17bII+, CFLO problems involving NPV are solved in the CFLO environment. This is entered by pressing [FIN] then [CFLO].

Figure 1

Figure 2

Figure 3

On this screen, the menu keys on the bottom of the display perform these functions:

CALC – Ends the entry of cash flow data and enters the cash flow calculation environment.

CFLO – Creates an empty entry in the cash flow list to allow for the insertion of a cash flow.

DELE – Deletes the currently displayed cash flow entry from the cash flow list.

NAME – Allows the present cash flow list to be saved as a named list in calculator memory.

GET – Used to retrieve a previously named cash flow list from memory. Or, to start a new list, press GET then CFLO., if you have already saved the current list.

#? – Toggles prompting for the number of times a cash flow occurs on or off. Default is ON. If turned off, the value used for the number of times a cash flow occurs is 1. The maximum value for this setting is 999. This setting is always turned on when you start a new cash flow list.

The HP 17bII+ uses a different approach to handling cash flow problems than other HP calculators. Rather than storing the cash flows in registers, the HP 17bII+ stores cash flows in lists that can be named and saved for future use. This also provides the flexibility to have multiple cash flow situations stored within the calculator at the same time. The number of cash flow analyses and individual cash flows stored in this manner are only limited by the available calculator memory.

Maintaining a cash flow list is covered in more detail in another learning module.

The initial cash flow is keyed (and changed to a negative number if appropriate) and entered using the INPUT CLR DATA key. If prompting for the number of times a cash flow occurs is turned on, you will need to enter the frequency for the cash flow and press INPUT CLR DATA again. If the default frequency of 1 is desired, then you can press INPUT CLR DATA twice in succession to proceed to the next cash flow. The remaining cash flows are entered in the same manner. When you have entered all cash flows, press EXIT MAIN followed by CALC to enter the calculation environment, which appears as shown below.

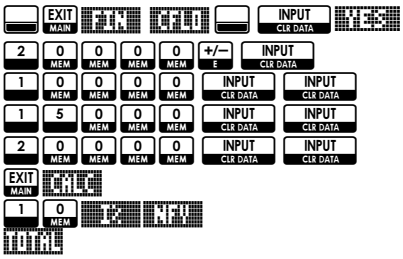
Figure 4

NOTE: The interest rate entered in the calculation environment is the PERIODIC interest rate. If the cash flows are monthly, then the interest rate should be the monthly interest rate. For example, if the interest rate is 6%, compounded monthly, and the cash flows being evaluated are monthly, then the interest rate entered should be 0.5.

Practice solving Net Present Value problems

Example 1: A company is considering replacing a machine. It will require an initial cash outlay of $20,000 and then is expected to generate cash flows the next 3 years of $10,000, $15,000 and $20,000. If the cost of funds for the company is estimated at 10%, what is the Net Future Value? Should the machine be replaced? What is the total of the entered cash flows?

Solution:



Answer: $21,980. If the company replaces the machine, they will be better off by $21,980 in three years from now dollars. The total of the cash flows is $25,000.

Example 2: For the decision in Example 1, what is the value of the Net Uniform Series measure? Should the machine be replaced? What is the total of the entered cash flows? Assume this example is being worked immediately after Example 1 has been completed.

Solution:

Answer: $6,640.48. An annual positive cash flow of $6,640.48 received at the end of the next 3 years would provide the same benefit and ending Net Future Value as the result in Example 1.

Example 3: A company is considering expanding a product line, which will require an investment today of $800,000. Future cash inflows are estimated to be $190,000 a year for 6 years followed by $90,000 a year for the 4 years thereafter. If the company's cost of funds is 15%, what is the NFV? Should the new product be introduced?

Solution:

Answer: $121,922.78. Yes, the product line should be expanded.

Example 4: Find the future of $200 three months from today, $400 four months from today, $200 a month from months 7 through 10, and $1000 twelve months from today. Assume interest is assessed at 8%, compounded monthly. RPN mode is shown for the last line of the keystrokes. For algebraic mode, the last line would be: .

Solution: This example will illustrate how to use the DCF functions to solve non-annuity, irregular payment problems. The cash flows or payments for this example could be summarized as:

Month 0: $0	Month 5: $0	Month 10: $200
Month 1: $0	Month 6: $0	Month 11: $0
Month 2: $0	Month 7: $200	Month 12: $1000
Month 3: $200	Month 8: $200	
Month 4: $400	Month 9: $200	

Answer: $2,453.01.