

Interest Recalculation for Flat Loan interest Types

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Currently on **mifos x 18.03.01** and other previous releases, If you have a loan with a **flat interest method** and **interest recalculation set to enabled**, you are not able to make prepayments and even repayments which are more than the due amounts. This is because there is a `compareTo()` method call on `fixedEmiAmount` (which is a `BigDecimal` object) in `AbstractLoanScheduleGenerator.java` (on line 532) which produces a `nullPointerException`. This is again because for loans with flat interest methods, one has no option of fixing the EMI Amount and so the `fixedEmiAmount` object is always null. Now seeing that the `compareTo()` check is not necessary, I have commented it out and rebuilt the sources and I'm able to make prepayments now.

However, the way that interest recalculation for loans with flat interest method work current, I don't think is right. For instance if I book a loan with the following parameters:

Principal	9000
Annual Interest Rate	60%
Duration (Months)	6
Number of Repayments	6
Disbursement Date	01-Feb-18

For flat interest method, I'm expecting total interest to be calculated first ($\text{principal} \times \text{interest} \times \text{no of days} / (\text{days in year})$): in this specific case we have $(9000 \times 60\% \times 182) / 366 = 2685.2459$. I will then add this interest to the principal and divide by the number of repayments to arrive at the instalment amount. That is $(9000 + 2685.25) / 6 = 1947.5417$. Therefore the original schedule should look something like the following:

DUE DATE	PRINCIPAL COMPONENT	INTEREST COMPONENT	INSTALLMENT DUE	PRINCIPAL BALANCE
01-Mar-18	1500	447.54	1,947.54	7500
01-Apr-18	1500	447.54	1,947.54	6000
01-May-18	1500	447.54	1,947.54	4500
01-Jun-18	1500	447.54	1,947.54	3000
01-Jul-18	1500	447.54	1,947.54	1500
01-Aug-18	1500	447.54	1,947.54	0
Total	9,000.00	2,685.25	11,685.25	

Now if I make no payments until on the 01-Apr-18 when I make a payment of 8,000 as prepayment, I should expect a new repayment schedule which would have been generated because **recalculate interest is enabled**. The new repayment schedule should differ depending on whether I have chosen at the product level that 1. EMI amount should reduce or that 2. The tenor of the loan rather shrinks and EMI remains the same.

In the case of #1 where EMI should shrink, I should simply clear the instalment amounts that are already due (ie 01-Mar-18 & 01-Apr-18). The outstanding amount further reduces the principal outstanding that is $(1500+1500+1500+1500)-(8000-1947.54-1947.54) = 1895.08$. Therefore we simple arrive at a new loan with the following parameters:

Principal	1895.08
Annual Interest Rate	60%
Duration (Months)	4
Number of Repayments	4
First Repayment Date	01-May-18

Hence the new schedule for (Reduce EMI upon interest recalculation) should look like below:

DUE DATE	PRINCIPAL COMPONENT	INTEREST COMPONENT	INSTALLMENT DUE	PRINCIPAL BALANCE
01-May-18	473.77	47.38	521.15	1,421.31
01-Jun-18	473.77	47.38	521.15	947.54
01-Jul-18	473.77	47.38	521.15	473.77
01-Aug-18	473.77	47.38	521.15	-
Total	1,895.08	189.51	2,084.59	

In the case of #2, however, because EMI should be kept constant and the tenor rather should shrink, the principal components will have to vary but only the recalculated interest should be spread equally on all the instalments so we should have a schedule like the following:

DUE DATE	PRINCIPAL COMPONENT	INTEREST COMPONENT	INSTALLMENT DUE	PRINCIPAL BALANCE
01-May-18	1,852.79	94.75	1,947.54	42.30
01-Jun-18	42.30	94.75	137.05	0
Total	1,895.08	189.51	2,084.59	

However, my observations are that, contrary to the expectations stated above:

1. The same schedule gets generated whether you select **Reduce EMI Amount** or **Reduce Tenor** - which is wrong
2. No actual interest recalculation happens; the original interest amount that was calculated on the initial Loan principal is kept unchanged and the principal is varied to come up with instalment amounts that are same as the original instalment amounts. The schedule the system is generating looks like the following:

DUE DATE	PRINCIPAL COMPONENT	INTEREST COMPONENT	INSTALLMENT DUE	PRINCIPAL BALANCE
01-				

May-18	1,500.00	447.54	1,947.54	395.08
01-Jun-18	395.08	447.54	842.62	0
Total	1,895.08	895.08	2,790.16	

It can be seen from the above schedule that no interest recalculation has happened and so this cannot be right.

I'm putting this through to the community so it can be discussed properly and we can arrive at the best way to **handle interest recalculation for flat interest method** loans