

# Bond Valuation Program for DM42 / Free42

The set of programs described here compute the price of a bond given the yield and solve for the yield given the price. It is also possible to compute the bond duration and convexity.

## INPUTS (GLOBAL VARIABLES)

CPN%	Annual bond coupon rate in percent
P/YR	Coupon frequency (1=Annual, 2=Semi-annual, 4=Quarterly)
CALL	Redemption Value as percent of par (normally 100)
DCB	Day Count Basis (Actual/Actual, 30/360, 30E/360)
SETT	Settlement Date
MAT	Maturity Date of the bond
I%	Yield to maturity (required when computing price)
PRICE	Clean price of the bond (required when solving for yield)

## OUTPUT

Function	Outputs	
PRICE	Accrual (Y)	Accrued coupon (0 if settlement is on a coupon date). Also stored in the global variable <b>ACCR</b> .
	Clean Price (X)	Stored in the global variable <b>PRICE</b> .
YTM	Yield to Maturity (X)	Stored in the global variable <b>I%</b> .
DURN	Macauley Duration (Z)	Not stored.
	Convexity (Y)	Stored in the global variable <b>CONV</b> .
	Modified Duration (X)	Change in price for a 1% change in yield, stored in the global variable <b>DURN</b> .

The stack contents are not preserved when the program is run.

The functionality is split over five programs of which four are to do with date arithmetic.

**Bond** - the main functionality with the pricing functions and application menu. Another global function label “**Yield**” is in the program because the solver needs it but it is used only within the program.

**LCDNCD** - Program to compute the previous and next coupon dates on either side of the settlement date.

**#DAYS** - Program to compute the number of days between two dates according to the day count basis specified.

**D→DMY** - Extract the day, month and year from a date specified as MDY, DMY or YMD.

**DMY→D** - Constructs a date in the system format (MDY / DMY / YMD) given day, month and year.

The programs cannot run directly on the original HP 42s because they use the extended functions in Free42 (LSTO, LASTO and RTNERR). These can be replaced by STO, ASTO and RTN at the expense of creating additional global variables when the program runs.

## Run Instructions and Testing

To test that the program is working correctly, enter the following keystrokes:

XEQ "Bond"

▽

6.5

I%

6

CPN%

2

P/YR

14.022011 (if DMY format is selected, otherwise 2.142011 or 2011.0214)

SETT

15.112020 (if DMY format is selected, otherwise 11.152011 or 2011.1115)

MAT

▽

100

CALL

ACT - this should result in a ■ symbol next to the menu button.

▽

PRICE

Result: Y should show 1.508287 (the accrued coupon) and X should show 96.418941 (the clean price). Adding the two together gives the dirty price.

DURN

Result: Z should show 7.474696 (the Macaulay duration), Y should show 65.195657 (the convexity) and X should show 7.239415 (the modified duration).

Now,

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PRICE

YTM

Result: X should show 5.727977 (the yield to maturity).