Variation of Parameters with the TI-89/92

Consider the following form a second order linear, non-homogeneous DE, $\frac{d^2y}{dx^2} + P(x)\frac{dy}{dx} + Q(x)y = f(x)$. Such a DE is readily solvable by the technique known as "variation of parameters," provided the fundamental set of solutions, $\{y_{c1}, y_{c2}\}$, is known. A particular solution of the DE, under appropriate restrictions is given by

$y_p = u_1(x) \cdot y_{c1}(x) + u_2(x) \cdot y_{c2}(x)$ $u_1 = \int \frac{-f(x) \cdot y_{c2}(x)}{W} dx$ $u_2 = \int \frac{f(x) \cdot y_{c1}(x)}{W} dx$	Recalling the Wronskian of for a two dimensional fundamental set of solutions is given by $W = Wr(y_{c1}, y_{c2}) = \begin{vmatrix} y_{c1} & y_{c2} \\ y'_{c1} & y'_{c2} \end{vmatrix} = y_{c1} \cdot y'_{c2} - y_{c2} \cdot y'_{c1}$
We should define the following TI-92 Wronskian function as	$f(x)$ $y_{c1}(x)$ $y_{c2}(x)$

Once the above is defined we may use the procedure shown at the side to find a particular solution for a DE in the given form. Note the $f(x)$, $y_{c1}(x)$, and $y_{c2}(x)$ must be determined from the given DE.

We can in fact create a 2nd function from the ideas in the above to directly calculate y_p from $y_{c1}(x)$ and $y_{c2}(x)$ as

Example: <u>**Find one!**</u>

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