Summary of using the **variation of parameters** method

Given the DE

$$a_2 y'' + a_1 y' + a_0 y = g(x) \qquad \text{.....(1)}$$

1. Put the equation in the standard form $y'' + py' + qy = f(x)$
2. Find y_h for the corresponding homogeneous equation. So $y_h = c_1 y_1 + c_2 y_2$
3. Calculate the Wronskian $W(y_1, y_2) = \begin{vmatrix} y_1 & y_2 \\ y_1' & y_2' \end{vmatrix}$
4. $u_1' = \dfrac{\begin{vmatrix} 0 & y_2 \\ f(x) & y_2' \end{vmatrix}}{W}$, $u_2' = \dfrac{\begin{vmatrix} y_1 & 0 \\ y_1' & f(x) \end{vmatrix}}{W}$
5. Integrate u_1' and u_2' to find u_1 and u_2
6. $y_p = u_1 y_1 + u_2 y_2$
7. Using 2 and 6, write the general solution of the given DE (1) as:

$$y = y_h + y_p$$