FORMULARIO SULLE EQUAZIONI DIFFERENZIALI

<table>
<tr><th></th><th>CLASSIFICAZIONE</th><th colspan="2">TIPOLOGIA</th><th colspan="2">SOLUZIONE</th></tr>
<tr><td rowspan="4">Equazioni Differenziali del PRIMO ORDINE</td><td>IMMEDIATE</td><td colspan="2">$\boldsymbol{y' = p(x)}$</td><td colspan="2">$\boldsymbol{y = \int p(x)\,dx + c}$</td></tr>
<tr><td>LINEARI OMOGENEE</td><td colspan="2">$\boldsymbol{y' = a(x)y}$</td><td colspan="2">$\boldsymbol{y = ke^{A(x)}}$ con $A(x) = \int a(x)\,dx$</td></tr>
<tr><td>LINEARI COMPLETE</td><td colspan="2">$\boldsymbol{y' = a(x)y + b(x)}$</td><td colspan="2">$\boldsymbol{y = e^{A(x)}\left[\int b(x)e^{-A(x)}\,dx + c\right]}$ con $A(x) = \int a(x)\,dx$</td></tr>
<tr><td>A VARIABILI SEPARABILI</td><td colspan="2">$\boldsymbol{y' = g(x)\cdot h(y)}$</td><td colspan="2">$\frac{dy}{dx} = g(x)\cdot h(y) \overset{h(y)\neq 0}{\rightleftarrows} \int \boldsymbol{\frac{dy}{h(y)}} = \int \boldsymbol{g(x)\,dx}$
Poi si controlla se $\boldsymbol{h(y) = 0}$ è anche una soluzione</td></tr>
<tr><td rowspan="4">Equazioni Differenziali del SECONDO ORDINE</td><td>IMMEDIATE</td><td colspan="2">$\boldsymbol{y'' = p(x)}$</td><td colspan="2">$y' = \int p(x)\,dx + c_1 \Longrightarrow \boldsymbol{y = \int\left[\int p(x)\,dx + c_1\right]dx + c_2}$</td></tr>
<tr><td rowspan="3">LINEARI OMOGENEE A COEFFICIENTI COSTANTI</td><td rowspan="3">$\boldsymbol{ay'' + by' + cy' = 0}$

Equazione Caratteristica:
$\boldsymbol{az^2 + bz + c = 0}$</td><td>$\Delta > \boldsymbol{0}$</td><td>$z_1$ e z_2 reali distinte</td><td>$\boldsymbol{y = c_1e^{z_1x} + c_2e^{z_2x}}$</td></tr>
<tr><td>$\Delta = \boldsymbol{0}$</td><td>z_1 e z_2 reali coincidenti $= z$</td><td>$\boldsymbol{y = c_1e^{zx} + c_2xe^{zx} = e^{zx}(c_1 + c_2x)}$</td></tr>
<tr><td>$\Delta < \boldsymbol{0}$</td><td>z_1 e z_2 complesse coniugate $= \alpha \pm \beta i$</td><td>$\boldsymbol{y = e^{\alpha x}(c_1\cos\beta x + c_2\sin\beta x)}$</td></tr>
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