

Ex 1

①  $y' = -5y$

$y(x) = e^{-5x}$

②  $2y' + 3y = 0 \Leftrightarrow y' = -\frac{3}{2}y$

$y(x) = Ce^{-\frac{3}{2}x}$

③  $4y' - y = 0 \Leftrightarrow y' = \frac{1}{4}y$

$y(x) = Ce^{\frac{1}{4}x}$

$y(0) = 6$

donc  $C = 6$

$y(x) = 6e^{\frac{1}{4}x}$

④  $y' = 7y + 5$

$y(x) = e^{7x} - \frac{5}{7}$

⑤  $3y' - 2y = 1 \Leftrightarrow 3y' = 2y + 1 \Leftrightarrow y' = \frac{2}{3}y + \frac{1}{3}$

$y(x) = Ce^{\frac{2}{3}x} - \frac{1}{2}$

⑥  $5y' + 3y = 4 \Leftrightarrow 5y' = -3y + 4 \Leftrightarrow y' = -\frac{3}{5}y + \frac{4}{5}$

$y(x) = Ce^{-\frac{3}{5}x} + \frac{4}{3}$

$y(5) = 0$  donc

$Ce^{-3} + \frac{4}{3} = 0$

$C = -\frac{4}{3}e^3$

$y(x) = -\frac{4}{3}e^3 e^{-\frac{3}{5}x} + \frac{4}{3}$

Ex 2

$10v'(t) + v(t) = 30$

donc  $v$  solution de  $10y' + y = 30$

$10y' + y = 30 \Leftrightarrow 10y' = -y + 30$

$\Leftrightarrow y' = -\frac{1}{10}y + 3$

donc  $v(t) = Ce^{-\frac{1}{10}t} + 30$

$v(0) = 0$  donc  $C + 30 = 0$  donc  $C = -30$ .

Ex 3

$f'(t) + \frac{1}{2}f(t) = 10$

et donc

$v(t) = -30e^{-\frac{1}{10}t} + 30$

$f$  solution de  $y' + \frac{1}{2}y = 10$

$y' + \frac{1}{2}y = 10 \Leftrightarrow y' = -\frac{1}{2}y + 10$

donc  $f(t) = Ce^{-\frac{1}{2}t} + 20$

$f(0) = 220$  donc  $C + 20 = 220$

$C = 200$

donc  $f(t) = 200e^{-\frac{1}{2}t} + 20$