Systems of Ordinary Differential Equations > Linear Systems of Three and More Equations

1. $\quad x'_t = ax, \quad y'_t = bx + cy, \quad z'_t = dx + ky + pz.$

Solution:

$$x = C_1 e^{at},$$
$$y = \frac{bC_1}{a-c}e^{at} + C_2 e^{ct},$$
$$z = \frac{C_1}{a-p}\left(d + \frac{bk}{a-c}\right)e^{at} + \frac{kC_2}{c-p}e^{ct} + C_3 e^{pt},$$

where C_1, C_2, and C_3 are arbitrary constants.