14. $x''_{tt} = f(t)(a_1x'_t + b_1y'_t)$, $y''_{tt} = f(t)(a_2x'_t + b_2y'_t)$.

Let k_1 and k_2 are roots of the quadratic equation

$$k^2 - (a_1 + b_2)k + a_1b_2 - a_2b_1 = 0.$$

Then the system in question can be reduced, by adding together the two equations multiplied by appropriate constants, to the following two independent equations:

$$z_1'' = k_1 f(t) z_1', \quad z_1 = a_2x + (k_1 - a_1)y;$$
$$z_2'' = k_2 f(t) z_2', \quad z_2 = a_2x + (k_2 - a_1)y.$$

Integrating these and returning to the original variables, one arrives at a linear algebraic system for the unknowns x and y:

$$a_2x + (k_1 - a_1)y = C_1 \int \exp\bigl[k_1F(t)\bigr]\,dt + C_2,$$
$$a_2x + (k_2 - a_1)y = C_3 \int \exp\bigl[k_2F(t)\bigr]\,dt + C_4,$$

where $C_1, \ldots, C_4$ are arbitrary constants and $F(t) = \int f(t)\,dt$.

