Systems of Ordinary Differential Equations > Nonlinear Systems of Two Equations

5.　$x = tx'_t + F(x'_t, y'_t), \quad y = ty'_t + G(x'_t, y'_t).$

Clairaut system.

The following are solutions of the system:

(i) straight lines:

$$x = C_1 t + F(C_1, C_2), \quad y = C_2 t + G(C_1, C_2),$$

where C_1 and C_2 are arbitrary constants;

(ii) envelopes of the above lines;

(iii) continuously differentiable lines made up from segments of the lines (i) and (ii).

http://eqworld.ipmnet.ru/en/solutions/sysode/sode0305.pdf