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BIFURCATION OF SADDLE-NODE AND SEPARATRIX CYCLE WITH THE VARIATION OF THE PARAMETER IN A CERTAIN QUADRATIC DIFFERENTIAL SYSTEM

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When we studied the (2,2) distributuon problem of limit cycles of a quadratic system [1], we have used three different rotated vector fields for the system:

$$\dot{x} = -y+\delta x+lx^2+mxy+ny^2,$$
$$\dot{y} = x(1+ax-y). \qquad (1)$$

Namely:

F_1: to vary $\delta x(1+ax-y)$, which is a whole plane rotated vector field;

F_2: to vary δx, a half plane rotated vector field;

F_3: to vary $mx(1-y)$. In this case the whole plane is divided by $1+ax-y=0$ and $1-y=0$ into four regions G_1, G_2, G_3, G_4 consecutively, such that when m increases, vector fields in G_1 and G_3 rotate in the one diretion, but in G_2 and G_4 they rotate in the other diretion.

We have already noticed that under F_1, finite critical points of (1) remain fixed both in number and in position, but the number and position of critical points at infinity may change. On the contrary, critical points at infinity remain fixed, but finite

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