22. $(1)\begin{cases} x' = x^3(y-b) \\ y' = y^3(x-a)^5 \end{cases}$

INDEED (a,b) IS AN EQUILIBRIUM OF (1). LET $u = y-b$ AND $w = x-a$. THEN $x = w+a$, $y = u+b$, $y' = u'$, AND $x' = w'$.
DEFINE $(2)\begin{cases} u' = (u+b)^3(w)^5 \\ w' = (w+a)^3(u) \end{cases}$
INDEED $(0,0)$ IS AN EQUILIBRIUM OF (2). LET $V = uw$
THEN
$$\dot{V} = V_u f_1 + V_w f_2 = w(u+b)^3 w^5 + u(w+a)^3 u$$
$$= w^6 (u+b)^3 + u^2(w+a)^3$$
AS SHOWN $|u|< b$ AND $|w|< a$ BY REPLACING x WITH w AND y WITH u FROM PREVIOUS ARGUMENT. THEREFORE, FOR ANY FIXED $a,b>0$ AND (x,y) IN A NBHD OF $(0,0)$ WE HAVE $u+b>0$ AND $w+a>0$. THUS, $\dot{V}$ IS $(+D)$.
WE NOTE $V = uw$ IS (I.D). THEREFORE, BY THM $(0,0)$ OF (2) IS (NS) $\Longrightarrow$ (a,b) OF (1) IS (NS).

23. $\begin{cases} x' = y + 2y^3 \\ y' = -x - 2x^3 \end{cases}$
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INDEED $(0,0)$ IS AN EQUILIBRIUM. LET $V = ax^2 + bx^4 + cy^2 + dy^4$
THEN
$$\dot{V} = 2ax(y+2y^3) + 4bx^3(y+2y^3) + 2cy(-x-2x^3) + 4dy^3(-x-2x^3)$$
$$= xy(2a-2c) + xy^3(4a-4d) + x^3y(4b-4c) + x^3y^3(8b-8d)$$
LET $a=b=c=d=1$. THEN $V = x^2+x^4+y^2+y^4$ IS $(+D)$.
AND $\dot{V} = 0$ IS $(-SD)$. THEREFORE, BY THM $(0,0)$ OF (A) IS (S) $\Longrightarrow$ $(0,0)$ IS (US).

24 $\begin{cases} x' = y \\ y' = z \\ z' = -y \end{cases}$

INDEED $(0,0,0)$ IS AN EQUILIBRIUM. LET $V = (x+z)^2 + y^2 + z^2$
THEN
$$\dot{V} = 2(x+z)^2(y-y) + 2yz - 2yz = 0$$
SO, V IS $(+D)$ AND $\dot{V}$ IS $(-SD)$. THEREFORE, $(0,0)$ IS (S)
$\Longrightarrow$ $(0,0,0)$ IS (US).