2. AC-DC: nonlinear dynamics

S

X

Z

S

S

$$\begin{array}{c}
\overline{x} \\
\overline{y} \\
\overline{z}
\end{array}$$

(a)

 $\begin{array}{c}
\overline{x} \\
\overline{x} \\
\overline{z}
\end{array}$
 $\begin{array}{c}
\overline{x} \\
\overline{y} \\
\overline{z}
\end{array}$

$$\frac{\partial \tilde{X}}{\partial \tilde{z}} = \frac{\tilde{\alpha}_{X} + \tilde{\beta}_{X} S}{1 + S + (\tilde{Z}/\tilde{Z}_{z})^{N_{ZX}}} - \tilde{S}_{X} \tilde{X}$$

$$\frac{\partial \tilde{z}}{\partial \tilde{z}} = \frac{\tilde{\alpha}_{Z}}{1 + (\tilde{X}/\tilde{Z}_{z})^{NXZ}} - \tilde{S}_{Z} \tilde{Z}$$

$$\frac{\tilde{\alpha}_{X} + \tilde{\beta}_{X} S}{1 + (\tilde{Z}/\tilde{Z}_{z})^{NXZ}} - \tilde{S}_{Z} \tilde{Z}$$

$$\begin{pmatrix}
2 \\
\frac{\partial X}{\partial t} = \frac{\alpha_x + \beta_x S}{1 + (\frac{\alpha}{X}/5)} \\
\frac{\partial X}{\partial t} = \frac{\alpha_x + \beta_x S}{1 + (\frac{\alpha}{X}/5)} \\
\frac{\partial Z}{\partial t} = \frac{1}{11} \frac{(\frac{\alpha}{X}/x_z)^{n \times 2}}{(\frac{\alpha}{X}/x_z)^{n \times 2}} - S_z Z$$

$$= \frac{\partial x}{\partial t} = \begin{bmatrix} \alpha_{x} + \beta_{x} & S \\ \frac{Z}{Z_{y}} \end{bmatrix}^{n_{x}} - X = \begin{bmatrix} \alpha_{x} + \beta_{x} & S \\ \frac{Z}{Z_{y}} \end{bmatrix}^{n_{z}} = X$$

$$= \frac{\alpha_{x} + \beta_{x} & S}{1 + S + \left[\frac{Z}{Z_{x}}\right]^{n_{z}}} - X$$

(b)

= 32 = 1 + \[\frac{x^2}{x} \]_\(\lambda x^2 \]

$$\frac{\alpha_{x} + \beta_{x}}{1 + S + \left[\frac{Z}{z_{x}}\right]^{n_{2x}}}$$

$$= \widetilde{S}_{z} \left[\frac{Z\widetilde{g}_{z}}{\widetilde{S}_{x}}\right]$$