32. Critical cases of indirect Lyapunov

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$\dot{x} = Ax \qquad A\ (n \times n)$

$\exists\ \mathcal{E}^s, \mathcal{E}^u, \mathcal{E}^c$, subspaces of $\mathbb{R}^n$, generated by eigenvectors which are invariant.

$\mathcal{E}^s \to \Lambda^s \subset \mathbb{C}^-$

$\mathcal{E}^u \to \Lambda^u \subset \mathbb{C}^+$

$\mathcal{E}^c \to \Lambda^c \subset \mathrm{Im}$

Invariance $\Leftrightarrow$ The dynamics can be projected over $\mathcal{E}^{(\dots)}$.

Assuming $\Lambda_u = \emptyset$ the stability reduces to the behaviors over $\mathcal{E}^c$.

In the NL case the LTM approximates the NL behaviors $\mathcal{M}_s$, but there's uncertainty for $\mathcal{M}_c$ and $\mathcal{E}_c$, because while in the linear case the eigenvalues go to ∞, in the nonlinear case they can converge to zero.

If $\mathcal{M}_c$ (locally) converges to x_e, cause it isn't dominated by $\mathcal{E}_c$ behaviors, then I have locally stable behaviors around x_e