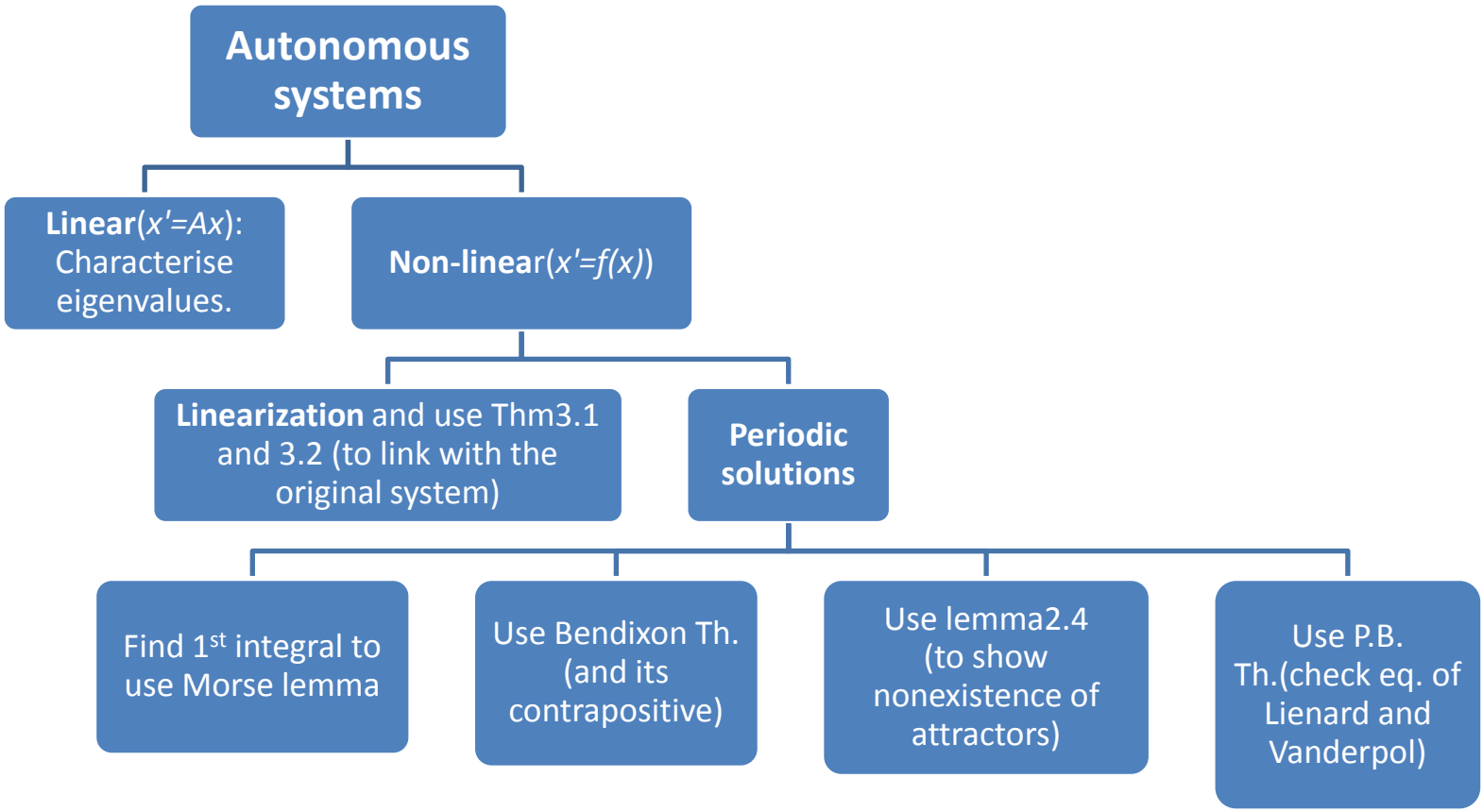
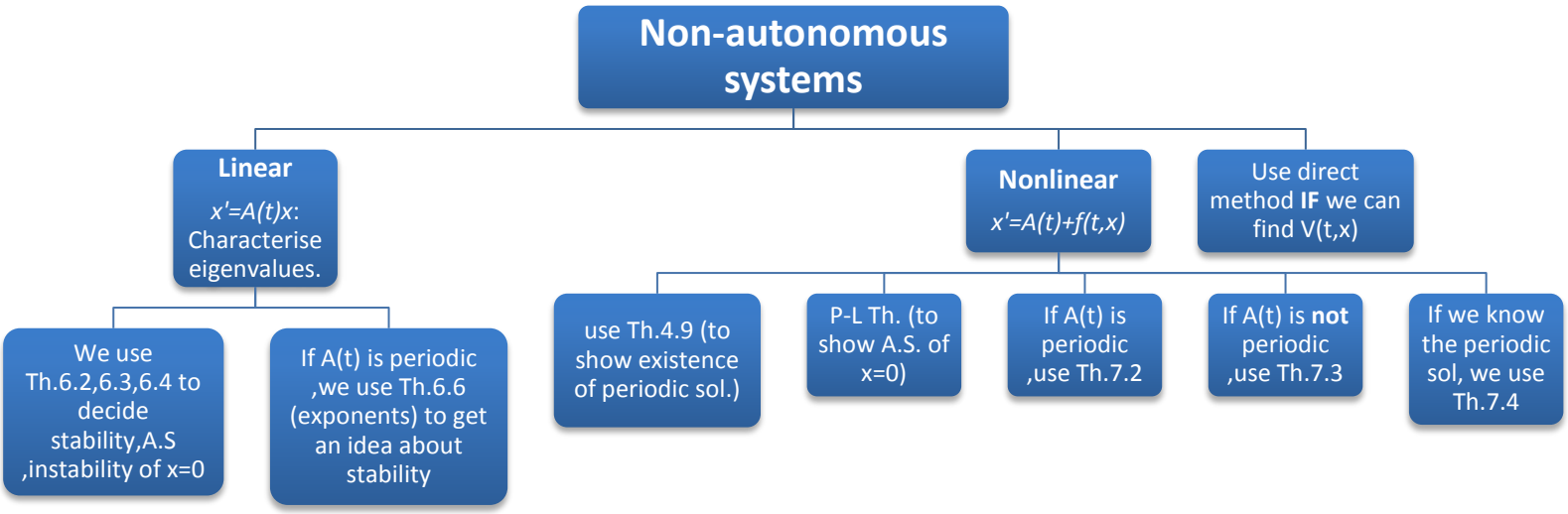

Autonomous systems
Linear($x'=Ax$): Characterise eigenvalues.
Non-linear($x'=f(x)$)
Linearization and use Thm3.1 and 3.2 (to link with the original system)
Periodic solutions
Find 1st integral to use Morse lemma
Use Bendixon Th. (and its contrapositive)
Use lemma2.4 (to show nonexistence of attractors)
Use P.B. Th.(check eq. of Lienard and Vanderpol)


Non-autonomous systems
Linear
x'=A(t)x: Characterise eigenvalues.
We use Th.6.2,6.3,6.4 to decide stability,A.S ,instability of x=0
If A(t) is periodic ,we use Th.6.6 (exponents) to get an idea about stability
Nonlinear
x'=A(t)+f(t,x)
Use direct method IF we can find V(t,x)
use Th.4.9 (to show existence of periodic sol.)
P-L Th. (to show A.S. of x=0)
If A(t) is periodic ,use Th.7.2
If A(t) is not periodic ,use Th.7.3
If we know the periodic sol, we use Th.7.4