

# Small Limit Cycles in Some Trigonometric Systems

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In this talk, we study the number of small limit cycles around a singular point in trigonometric systems. Our first result gives sharp upper bounds on the number of zeros of the associated first order Melnikov functions near  $h = 0$  for pendulum equations under small perturbations. Some further results give Hopf cyclicity at the origin for some trigonometric Liénard systems.