Luminy le 4 octobre 96

"Quick upper bounds for Kissing numbers"

τ_n = Kissing number in dimension n
= max. # of balls of equal radius which can be placed around another of same radius without any two overlapping

Known

n	1	2	3	8	24	...	4
τ_n	2	6	12	240	196560	?	24 or 25

λ_n = max. kiss. number in dim. n which can be attained by lattices

$= \max_{L \subseteq \mathbb{R}^n} a_1(L)$, $a_1(L) = \#$ vectors of minimal pos. length in L

n	1 ... 9	8	24
λ_n	known	s.a.	s.a.

But: $\lambda_9 < \tau_9$.

Wants: 1) good bounds for λ_n to above
2) "asymptotic" bounds to above

For 2) Kabatiansky – Levenshtein

$$\tau_n \leq 1.32042^{n(1+o(1))}$$

$$(\text{Wyner: } \tau_n \geq 1.15463^{n(1+o(1))})$$

How to obtain such bounds. Don't know...
But have an idea how to produce (easily) such bounds,
and can perhaps beat K-L?
Ideas originate partly from ~~joint work with~~
insights which originate from joint work with
Friedman on bounds to below of regulators.