naive:
$O(n^2)$ by hashing.
$O(n^2)$ deterministic: after sorting, enumerate the first number, find the pair of second and third number by monotone pointers.

if we only want to decide whether there exist a triple which sum to 0:
for real numbers:
deterministic $O((n^2/\log^2 n)(\log\log n)^{O(1)})$, Chan [2].

for integers:
randomized $O((n^2/\log^2 n)(\log\log n)^2)$ [1], via hashing techniques.

note.
1. if we want to find all triplets, the output complexity is $\Theta(n^2)$ in the worst case.
2. there are many variants of 3sum, most of them are equivalent.

References

[1] Ilya Baran, Erik D Demaine, and Mihai Pătraşcu. Subquadratic algorithms for 3SUM. *Algorithmica*, 50(4):584–596, 2008.

[2] Timothy M Chan. More logarithmic-factor speedups for 3sum,(median,+)-convolution, and some geometric 3sum-hard problems. In *Proceedings of the Twenty-Ninth Annual ACM-SIAM Symposium on Discrete Algorithms*, pages 881–897. SIAM, 2018.