The thesis deals with polynomial interpolation of functions in one and several variables. We shall be mostly concerned with Lagrange interpolation but one of our work deals with Kergin and Hakopian interpolants. We denote by $\mathbb{K}$ the field that may be either $\mathbb{R}$ or $\mathbb{C}$, and $\mathcal{P}_d(\mathbb{K}^N)$ the vector space of all polynomials of N variables of degree at most d. The set $A \subset \mathbb{K}^N$ is said to be an unisolvent set of degree d if it is not included in the zero set of a polynomial of degree not greater than d. For every function f defined on A, there exists a unique $\mathbf{L}[A; f] \in \mathcal{P}_d(\mathbb{K}^N)$ such that $\mathbf{L}[A; f] = f$ on A, which is called the Lagrange interpolation polynomial of a function f at A. Kergin and Hakopian interpolants are natural multivariate generalizations of univariate Lagrange interpolation. The construction of these interpolation polynomials requires the use of points with which one obtains a number of natural mean value linear forms which provide the interpolation conditions. The quality of approximation furnished by interpolation polynomials much depends on the choice of the interpolation points. In turn, the quality of the interpolation points is best measured by the growth of the norm of the linear linear operator that associates to a continuous function its interpolation polynomial. This norm is called the Lebesgue constant. Most of this thesis is dedicated to the study of such constant. We provide for instances the first general examples of multivariate points having a Lebesgue constant that grows like a polynomial. This is an important advance in the field.