Semi-algebraic sets occur naturally when dealing with implicitmodels and boolean operations between them. In this work we presentan algorithm to efficiently and in a certified way computethe connected components of semi-algebraic sets given byintersection or union of conjunctions of bi-variate equalities andinequalities. For any given precision, this algorithm can alsoprovide a polygonal and isotopic approximation of the exact set. Theidea is to localize the boundary curves by subdividing thespace and then deduce their shape within small enough cells usingonly boundary information. Then a systematic traversal of theboundary curve graph yields polygonal regions isotopic to theconnected components of the s.a. set. Space subdivision is supportedby a kd-tree structure and localization is done using Bernsteinrepresentation. We provide examples using our C++ implementationin the CAS Mathemagix.Changement de l’exposition souhaitée.