

Abstract: The paper presents two different state estimation decoupling techniques using node voltages in rectangular co-ordinates: the exact-decoupled technique and the modified fast-decoupled technique. The proposed techniques decouple the Jacobian matrix into real- and reactive-power submatrices, which are evaluated only once at the beginning of the process. The paper also presents efficient data structure management algorithms to improve the computational process required in calculating the nonzero elements of the Jacobian matrix, and the elements of the mismatching vector, which are essential to any state estimation problem. The performance of these techniques and algorithms are evaluated using several power system networks.