Combining horizontal drilling together with hydraulic fracturing greatly improves the economic viability of exploiting a tight reservoir, while the stress-sensitive effect raises the significant difficulty to accurately evaluate its well performance.Not only does this study facilitate understanding the respective contribution of stress-sensitivity and convergence-skin effect on the well production, but also the newly proposed models can be applied to optimally design a hydraulic fracturing operation under various constraints.More specifically, the boundary element method coupled with the Pedrosa's transform formulation is used to obtain accurate solutions of the nonlinear equations incorporated with stress-sensitive effect in an arbitrary-shaped reservoir with single-zone or two-zone matrix subsystems.Meanwhile, the Laplace-transform finite difference method can be utilized to semi-analytically deal with the nonlinear fracture subsystems consisting of primary, secondary, and natural fractures by dividing complex fracture networks into small fracture segments.Based on the sensitivity analysis associated with different networks, the initial fracture conductivity in primary and secondary fractures imposes a great impact on the early-stage bilinear flow and fluid feed regimes, while the initial fracture conductivity in natural fractures makes a difference to the transient pressure response in the transition flow regime.Not only can the effects of stress-sensitivity in the matrix and different fracture subsystems be respectively examined, but also the corresponding pressure responses together with .pressure derivative curves are obtained