**Algorithm 1:** Calculating Flow Property of Water Flooding

1. Set parameters:
2. Compute normalized saturation for water and oil phases, ;
3. Compute endpoint mobility ratio,
4. Compute relative permeability for water and oil phases,
5. Compute fractional flow for water and oil phases,
6. Compute the derivative of water fractional flow with respect to normalized water saturation,
7. Compute normalized tangent function, , using the Secant method to determine the point where
8. Compute the value of water saturation at shock front, .
9. Return

**Algorithm 2:** Calculating Flow Property of Water and Surfactant Flooding

1. Set water flooding parameters:
2. Set surfactant flooding parameters:
3. Set other parameters:
4. Calculate water flooding using Algorithm 1.
5. Calculate for surfactant flooding using Algorithm 1, where
6. Compute water saturation, , at the oil bank. This is calculated by using the Secant method to determine the point where
7. Determine the saturation profile.
8. Return and saturation profile