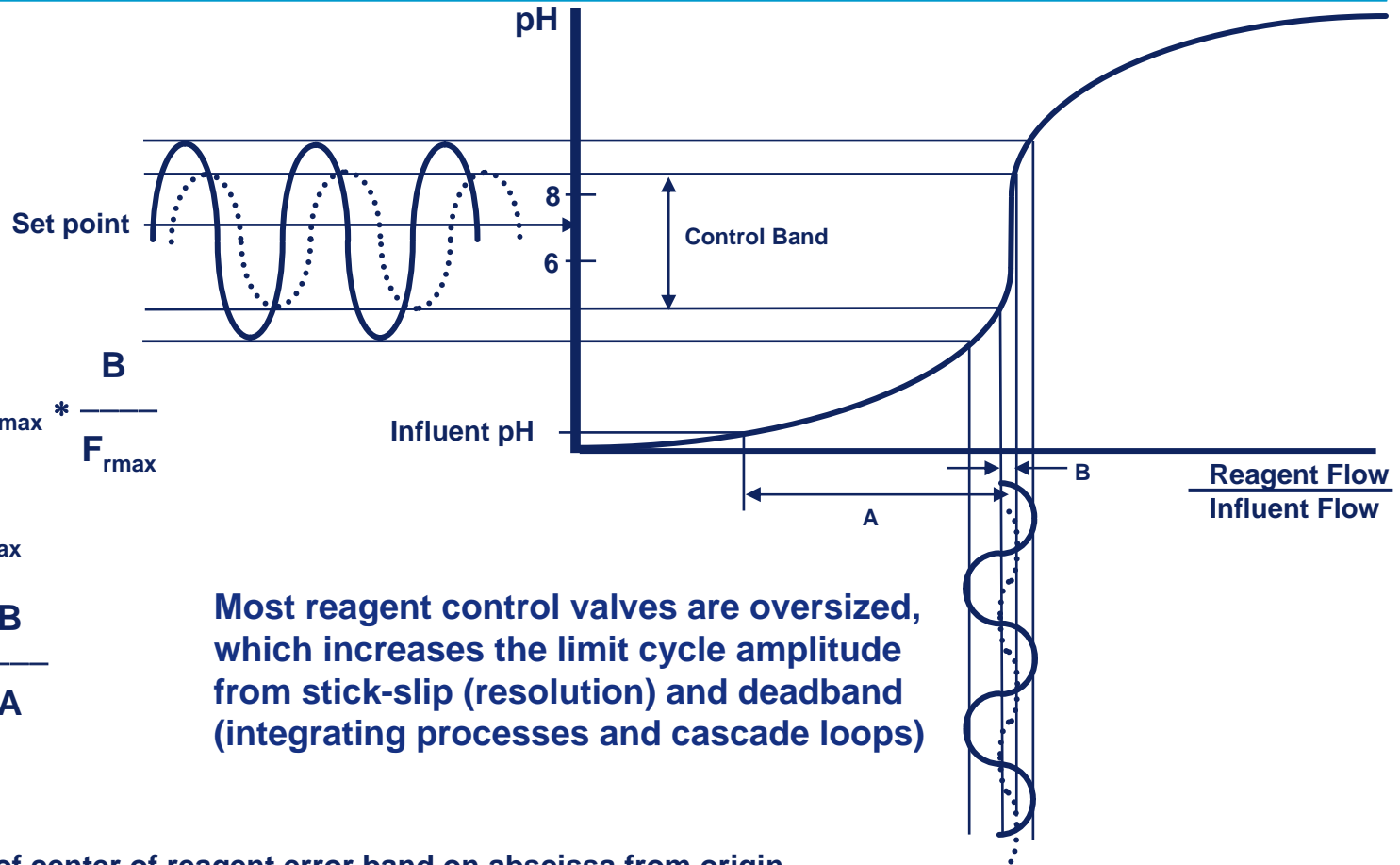


pH Control Valve Size and Resolution



$$E_r = 100\% * F_{imax} * \frac{B}{F_{rmax}}$$

$$F_{rmax} = A * F_{imax}$$

$$E_r = 100\% * \frac{B}{A}$$

$$S_s = 0.5 * E_r$$

Most reagent control valves are oversized, which increases the limit cycle amplitude from stick-slip (resolution) and deadband (integrating processes and cascade loops)

- A = distance of center of reagent error band on abscissa from origin
- B = width of allowable reagent error band on abscissa for control band
- E_r = allowable reagent error (%)
- F_{rmax} = maximum reagent valve capacity (kg per minute)
- F_{imax} = maximum influent flow (kg per minute)
- S_s = allowable stick-slip (resolution limit) (%)