

# Mathematical Model

$$\frac{dw}{dr} + \phi W_e^2 (1 - a^2) \left( \frac{dw}{dr} \right)^3 - \frac{S_t}{2} W_e^2 (1 - a^2) \left( (1 + d)^2 \frac{1}{r} - r \right) \left( \frac{dw}{dr} \right)^2 + \frac{S_t}{2} \left( (1 + d)^2 \frac{1}{r} - r \right) = 0$$

## SCENARIOS

**I**

Variations in  $S_t$

Case I :  $S_t = 0.1$

Case II :  $S_t = 0.2$

Case III :  $S_t = 0.4$

**II**

Variations in  $W_e$

Case I :  $W_e = 0.1$

Case I :  $W_e = 0.1$

Case III :  $W_e = 0.4$

**III**

Variations in  $\phi$

Case I :  $\phi = 1.0$

Case I :  $\phi = 2.0$

Case I :  $\phi = 3.0$

**IV**

Variations in  $a$

Case I :  $a = 1.0$

Case I :  $a = 0.8$

Case I :  $a = 0.5$