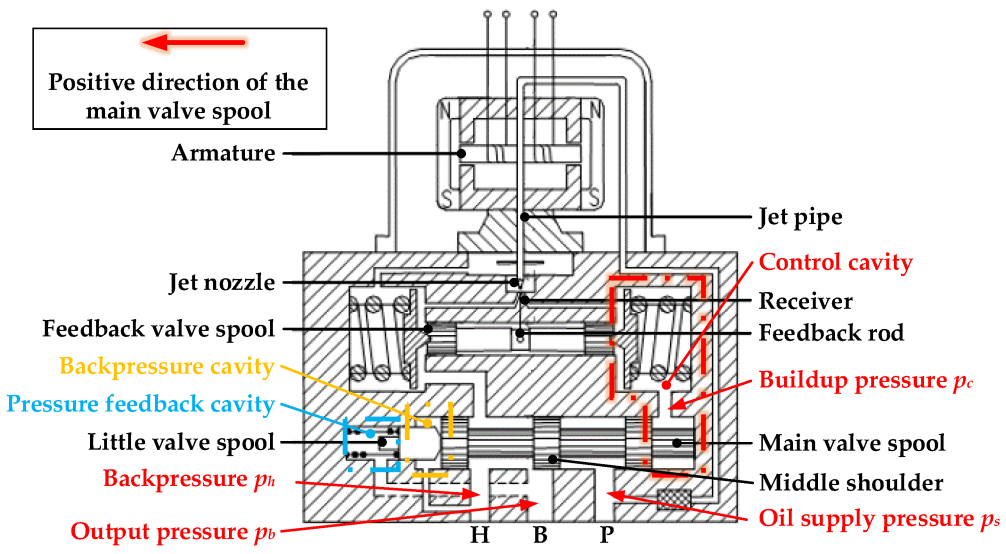
Mathematical Modle of Servo Valve

2025 年 1 月 23 日

伺服阀结构图


Positive direction of the main valve spool
Armature
Jet pipe
Control cavity
Jet nozzle
Receiver
Feedback valve spool
Feedback rod
Backpressure cavity
Buildup pressure p_c
Pressure feedback cavity
Little valve spool
Main valve spool
Backpressure p_h
Middle shoulder
Oil supply pressure p_s
Output pressure p_b
H
B
P
N
S

压力和电流

$$\frac{P}{I}(s) = K\left[\frac{\omega_n^2}{\omega_n^2 + 2\zeta\omega_n s + s^2}\right]$$

$K :=$ pressure control servovalve static gain (压力控制伺服阀静态增益)

$\omega_n = 2\pi f_n :=$ apparent natural frequency (表观固有频率)

$\zeta :=$ apparent damping ratio (表观阻尼比)

$P :=$ servovalve differential pressure output (伺服阀压差输出)

$I :=$ differential current input to servovalve (伺服阀的差分电流输入)

$s :=$ Laplace operator

$$P = P_{out} - P_{in}$$

Acknowledgement

Thank you!