Slide 53:

It is a speed sensor (Note its input and output)

Assumptions: 1. Neglect inertia and shaft flexibility; 2. damping is linear

Issues:

1. In this device, DC gain is inversely proportional to the spring stiffness (which also is a kind of gain).
2. Unlike typical devices, here High DC gain ➔ high time constant ➔ low speed of response and high sensor error (because, the s term begins to dominate. *Note*: Frequency where the *s* term begins to dominate (i.e., corner frequency) = $1/\tau$)
3. But, like for typical devices, the stability deteriorates when the DC gain increases (because, the real pole location $-1/\tau$ gets closer to the origin).