



$$a_z = d + K G_{inner} \cdot A(s) u_c$$

$$= d + K G_{inner} \cdot \overbrace{A(s)}^u u_c$$

$$= d + K G_{inner} \frac{A(s)}{1 \mp A(s) H(z)} \tilde{u}$$

$$= d + K G_{inner} \frac{A(s)}{1 \mp A(s) H(z)} G_{inner}^{-1} \tilde{u}$$

$$= d + K G_{inner} \frac{A(s)}{1 \mp A(s) H(z)} G_{inner}^{-1} G_{outer}^{-1} [a_{z,ref} - a_{z,f}]$$

$$= d + \underbrace{K G_{inner} \frac{A(s)}{1 \mp A(s) H(z)} G_{inner}^{-1} G_{outer}^{-1}}_C [a_{z,ref} - H(z) a_z]$$

$$= d + C [a_{z,ref} - H(z) a_z] = d + C a_{z,ref} - C H(z) a_z$$

$$\Rightarrow a_z [1 + C H(z)] = d + C a_{z,ref}$$

$$\Rightarrow a_z = \frac{d}{1 + C \cdot H(z)} + \frac{C}{1 + C \cdot H(z)} a_{z,ref}$$

$$C = K \cancel{G_{inner}} \frac{A(s)}{1 \mp A(s) H(z)} \cancel{G_{inner}^{-1}} G_{outer}^{-1} \stackrel{\approx 1 \text{ (for } p-z=0)}{=} \frac{K A(s) \cancel{G_{outer}^{-1}}}{1 \mp A(s) H(z)} = \frac{K A(s)}{1 \mp A(s) H(z)}$$

$$\Rightarrow a_z = \frac{d}{1 + \frac{K A(s) H(z)}{1 \mp A(s) H(z)}} + \frac{\frac{K A(s)}{1 \mp A(s) H(z)}}{1 + \frac{K A(s) H(z)}{1 \mp A(s) H(z)}} \cdot a_{z,ref}$$