Application Note:

Closed Loop Control System
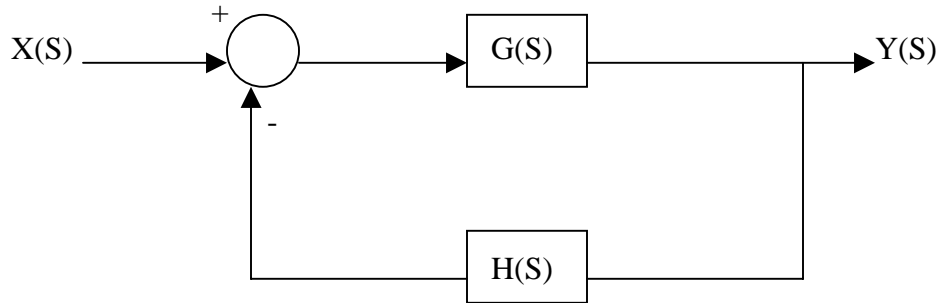
January 2009

Review

X(S) ─────────→ (+ / -) ─────────→ | G(S) | ─────────→ Y(S)
                            │   │
                            └──────| H(S) |───────────┘

Note: X(S): Input function
               G(S): Controller function
               Y(S): Output function
               H(S): Transfer Function (feedback)

Output is obtained by:

$$Y(S) \ = \frac{G(S)\,X(S)}{1 + G(S)\,H(S)}$$

Y(S) is also denoted as feedback transfer function.

The question is why closed loop?

The simple answer to this is because we have control over the behavior of the system by adding a feedback.

How much control can we have?

This depends on the type of system performance is desired. Better performance requires better feedback.

Other important factor about closed loop control system is that it provides a stable performance when dealing with the system feedback. This is where in some applications, PLL (Phase lock loop) is deployed where closed loop bandwidth is often referred to as PLL bandwidth.

<u>Important Notes</u>

1. This document is provided for reference purposes only. Brazen Tek neither makes warranties or representations with respect to the accuracy or completeness of the information contained in this document nor grants any license to any intellectual property rights.

2. Brazen Tek shall have no liability for damages or infringement of any intellectual property or other rights arising out of the use of any information in this document, including, but not limited to, product data, diagrams, charts, programs, algorithms, and application circuit examples.

3. This application note or the technology described in this document is not for the purpose of military applications such as the development of weapons of mass destruction or for the purpose of any other military use.

4. Brazen Tek assumes no liability whatsoever for any damages incurred as a result of errors or omissions in the information included in this document.

5. When using or otherwise relying on the information in this document, you should evaluate the information in light of the total system before deciding about the applicability of such information to the intended application. Brazen Tek makes no representations, warranties or guaranties regarding the suitability of its products for any particular application and specifically disclaims any liability arising out of the application and use of the information in this document.

6. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written approval from Brazen Tek.