

# THE EXTENT OF WINDUP AND THE BENEFITS OF ANTI-WINDUP

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## ABSTRACT

The closed-loop performance of a process with actuator limitation usually deteriorates with respect to the expected unlimited closed-loop performance. Such a deterioration is referred to as windup phenomenon. This paper explains how windup effect can be predicted and measured by calculating the integral of the difference between the limited and unlimited process time responses. It is shown that such an integral, when no protection against windup is used, is equal to zero. This result can be used to explain why a strong windup effect behaved as big overshoot and long settling time will be produced when the difference between the limited and unlimited process time responses is big during the limitation. The paper also shows why a suitable anti-windup compensator can reduce the windup effect.