Cascaded PID Control

state estimation ← sensors ← [quadcopter] ← motors ← airframe

State Variable

x

State Rate

$\dfrac{dx}{dt}$

MASTER

input

command input (throttle, pitch, roll, yaw) → setpoint → **G** → Scaled setpoint → IIR → − → error → P + I + D *windup guard derivative filter* → output → setpoint

SLAVE

input

G → Scaled setpoint → IIR → − → error → P + I + D *windup guard derivative filter* → output
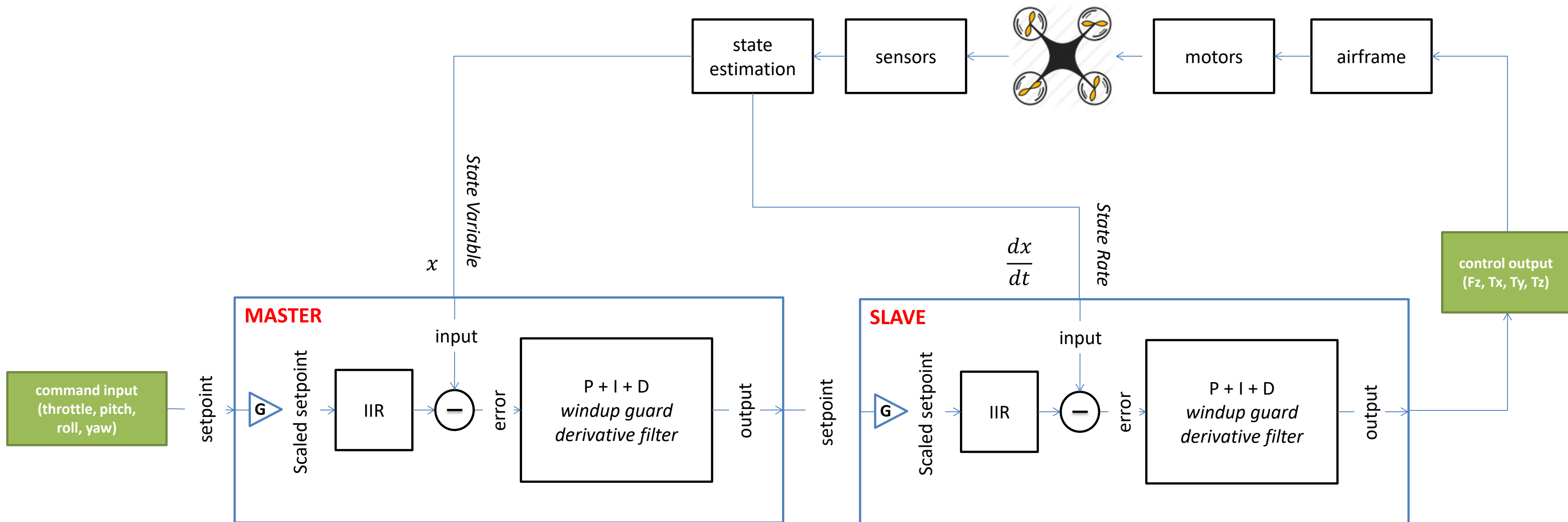
control output (Fz, Tx, Ty, Tz)

Control BW limited by accel @ 5Hz
IIR filter BW @ 30Hz
D term filter @ 20Hz

Control BW limited by gyro @ 184Hz
IIR filter BW @ 300Hz
D term filter @ 200Hz

PID *bypass = true* sets output to setpoint on calls to compute()