

## Re: Do you think NI can fix my PLL? -- Details

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- *From:* CC <[somewhere@xxxxxxxxxxxxxxxxxxxxxx](mailto:somewhere@xxxxxxxxxxxxxxxxxxxxxx)>
  - *Date:* Fri, 02 Jun 2006 20:46:06 -0700
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Tim Wescott wrote:

I think the root of your problem lies in the amplifier.

Your brushed DC motor system has magnets attached to the case, a thingy wound with coils attached to the shaft, an amplifier that delivers current to a switch, and a switch that directs that current to the appropriate coils depending on the angle of the shaft with relation to the case (and hence the magnets with relation to the coils).

Your brushless "DC" motor system has magnets attached to the shaft, a thingy wound with coils attached to the case, sensors that tell you where the shaft is in relation to the case, and what sounds like this gawdaful mess of electronics interposed between your torque command and your coils.

Which appears to be almost an "industry standard" drive topology. Even the packaging varies little between vendors.

You say you're driving the brushed motor with a power op-amp that's being driven by your torque command -- why not do the same thing with your brushless motor?

Well it was simple with the PM motor, and at only about 45W delivered, a relatively small and easy to manage heat dissipation.

Get three power op amps that are big enough to

handle the current, take the signals from your motor's position sensors and commutate your drive current (or drive voltage) command with an appropriate complement of 405x switches, and do the whole thing linearly. You won't have any concerns about the internal PWM of the drive doing weird things because there won't be any. You won't have to worry about internal sampling in the controller, or weirdo loops, or any of that, either.

Wow. I never thought of doing it that way. Very interesting. I wonder how long it will take me to figure out how to do the commutation...

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I suspect that if you do this you will find out two things: one, the room will be warmer when the system is running, and two, the brushless motor/amplifier system will act a whole lot more like the brushed motor/amplifier system did.

Yes and yes. I didn't think seriously of attempting a linear drive for this thing simply because PWM drives are the norm, and I didn't want to mess with figur