

includes a decay-to-stop voltage plot 530. As shown, the decay-to-stop voltage plot 530 relates fractional decay characteristics to stop response threshold voltages.

More specifically, the decay-to-stop voltage plot 530 includes a first through sixth fractional decay characteristics ζ_1 - ζ_6 respectively corresponding to the first through fifth stop response voltage thresholds V_1 - V_5 and the stop response voltage V_{stop} . The first through sixth fractional decay characteristics ζ_1 - ζ_6 are determined at the stop response voltage thresholds V_1 - V_{stop} relative to, for example, a common start response voltage V_{start} . That is, with reference to FIG. 3, the a first through sixth fractional decay characteristics ζ_1 - ζ_6 of FIG. 5 are determined at stop response threshold voltages relative to a common start response voltage V_{start} .

As can be seen, the decay-to-stop voltage plot 530 decreases as the stop response threshold voltage increases. This indicates that the fifth fractional decay characteristic ζ_5 of FIG. 5 determined from, for example, the start response voltage V_{start} to the fifth stop response voltage threshold V_5 of FIG. 3 is greater than, for example, the first fractional decay characteristic ζ_1 determined from the start response voltage V_{start} to the first stop response voltage threshold V_1 shown in FIG. 3.

FIG. 6 shows a graph 600 showing a relationship between decay characteristic errors and stop response voltages. As shown in FIG. 6, the graph 600 includes a stop response voltage axis 610 and a decay characteristic error axis 620. The stop response voltage axis 610 is in units of volts and the decay characteristic error axis 620 is unitless. The stop response voltage axis 610 ranges from 0 to 0.08 volts and the decay characteristic error axis 620 ranges from -0.003 to 0.007, although any suitable range may be employed. The graph 600 also includes an error-to-response voltage plot 630 that decreases from an error of about 0.0061 to about -0.0018 over the response voltage range of 0.01 volts to 0.067 volts. Also shown is an error-to-response voltage function 640 that ranges from about 0.006 to about -0.0018.

The error-to-response voltage plot 630 is comprised of a plurality of errors determined as a difference between the third fractional decay characteristic at the third stop response voltage V_3 relative to the start response voltage V_{start} shown in FIG. 5. As a result, the error-to-response voltage plot 630 looks similar to the decay-to-stop voltage plot 530 shown in FIG. 5. However, the error-to-response voltage plot 630 crosses the stop response voltage axis 630 at the third stop response voltage V_3 value

We claim:

1. A meter electronics (20) for determining a decay characteristic of a meter assembly (10) of a flow meter (5), the meter electronics (20) comprising an interface (201) for receiving a vibrational response from a meter assembly (10), the vibrational
5 response comprising a response to an excitation of the meter assembly (10) at a substantially resonant frequency, and a processing system (203) in communication with the interface (201), the processing system (203) being configured to:
 - receive the vibrational response from the interface (201);
 - determine a response voltage (V) of the vibrational response;
 - 10 determine a decay characteristic (ζ) of the meter assembly (10) based on the response voltage (V); and
 - compensate the decay characteristic (ζ) by using a previously determined decay characteristic-to-response voltage relationship.
- 15 2. The meter electronics (20) of claim 1, wherein the previously determined decay characteristic-to-response voltage relationship includes one of a start response voltage and a stop response voltage used to determine the decay characteristic (ζ).
3. The meter electronics (20) of claim 1, wherein the previously determined decay
20 characteristic-to-response voltage relationship relates a previously determined decay characteristic with one of a start response voltage and a stop response voltage.
4. The meter electronics (20) of claim 1, wherein the previously determined decay characteristics-to-response voltage relationship is a decay characteristics error-to-
25 response voltage function.
5. The meter electronics (20) of claim 1, wherein determining the decay characteristic (ζ) further comprises allowing the response voltage (V) of the vibrational response of the meter assembly (10) to decay down to a predetermined stop response
30 voltage.

6. The meter electronics (20) of claim 1, with the processing system (203) being further configured to determine the decay characteristic (ζ) by removing the excitation of the meter assembly (10) and allowing the response voltage (V) of the vibrational response of the meter assembly (10) to decay down to a predetermined stop response voltage.
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7. A method for determining a decay characteristic of a meter assembly of a flow meter, the method comprising receiving a vibrational response from the meter assembly, the vibrational response comprising a response to an excitation of the meter assembly at
10 a substantially resonant frequency, with the method further comprising:
 - receiving the vibrational response;
 - determining a response voltage of the vibrational response;
 - determining a decay characteristic of the meter assembly based on the response voltage; and
 - 15 compensating the decay characteristic by using a previously determined decay characteristic-to-response voltage relationship.
8. The method of claim 7, wherein the previously determined decay characteristic-to-response voltage relationship includes one of a start response voltage and a stop
20 response voltage used to determine the decay characteristic.
9. The method of claim 7, wherein the previously determined decay characteristic-to-response voltage relationship relates a previously determined decay characteristic with one of start response voltage and stop response voltage.
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10. The method of claim 7, wherein the previously determined decay characteristics-to-response voltage relationship is a decay characteristics error-to-response voltage function.
- 30 11. The method of claim 7, wherein determining the decay characteristic further comprises allowing the response voltage of the vibrational response of the meter assembly to decay down to a predetermined stop response voltage.

12. The method of claim 7, wherein the decay characteristic is determined by removing the excitation of the meter assembly and allowing the response voltage of the vibrational response of the meter assembly to decay down to a predetermined stop
- 5 response voltage.