CLAIMS

1. A multiple temperature sensor system (120), comprising:

a temperature sensor network (180) comprising:

a plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187);

a plurality of frequency-selective input filters (184) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing a plurality of distinct time-varying signals into the temperature sensor network (180); and

a multiplexer or a plurality of frequency-selective output filters (185) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing a plurality of attenuated distinct time-varying signals out of the temperature sensor network (180); and

a temperature measurement controller (161) coupled to the temperature sensor network (180) and configured to inject the plurality of distinct time-varying signals into the temperature sensor network (180), receive the plurality of attenuated distinct time-varying signals from the temperature sensor network (180) in response to the injection, with the plurality of attenuated distinct time-varying signals being attenuated by the plurality of temperature sensing resistors (186, 187), and generate two or more substantially simultaneous temperature values from the plurality of attenuated distinct time-varying signals.

2. The multiple temperature sensor system (120) of claim 1, wherein the multiple temperature sensor system (120) is adapted to be used in a Coriolis mass flow meter.

3. The multiple temperature sensor system (120) of claim 1, wherein the multiple temperature sensor system (120) is adapted to be used in a vibrating densitometer.

4. The multiple temperature sensor system (120) of claim 1, wherein:

the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four

time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and

the plurality of frequency-selective output filters (185) comprises five frequency-selective output filters (185A-185E) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161).

5. The multiple temperature sensor system (120) of claim 1, wherein:

the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and

the plurality of frequency-selective output filters (185) comprises five frequency-selective output filters (185A-185E) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161), with the five frequency-selective output filters (185A-185E) including two outputs to the temperature measurement controller (161).

6. The multiple temperature sensor system (120) of claim 1, wherein:

the multiplexer is (183) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing the plurality of attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161).

7. The multiple temperature sensor system (120) of claim 1, wherein:

the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four

time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and

the plurality of frequency-selective output filters (185) comprises eight frequency-selective output filters (185A-185H) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161).

8. The multiple temperature sensor system (120) of claim 1, wherein:

the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and

the plurality of frequency-selective output filters (185) comprises eight frequency-selective output filters (185A-185H) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161), with the eight frequency-selective output filters (185A-185H) including a single output to the temperature measurement controller (161).

9. The multiple temperature sensor system (120) of claim 1, wherein:

the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and

the plurality of frequency-selective output filters (185) comprises five frequency-selective output filters (185A-185E) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor

network (180) into the temperature measurement controller (161), with the five frequency-selective output filters (185A-185E) including a single output to the temperature measurement controller (161).

10. A temperature determination method for a multiple temperature sensor system, the method comprising:

injecting a plurality of distinct time-varying signals into a temperature sensor network including a plurality of temperature-sensing resistors and a plurality of frequency-selective filters, with the plurality of frequency-selective filters comprising a plurality of frequency-selective output filters coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} and passing the plurality of distinct time-varying signals from the temperature measurement controller into the temperature sensor network and a plurality of frequency-selective input filters coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} and passing the plurality of attenuated distinct time-varying signals from the temperature sensor network into the temperature measurement controller;

receiving a plurality of attenuated distinct time-varying signals from the temperature sensor network in response to the injection, with the plurality of attenuated distinct time-varying signals being attenuated by the plurality of temperature sensing resistors; and

generating two or more substantially simultaneous temperature values from the plurality of attenuated distinct time-varying signals.

11. The method of claim 10, wherein the multiple temperature sensor system is used in a Coriolis mass flow meter.

12. The method of claim 10, wherein the multiple temperature sensor system is used in a vibrating densitometer.

13. The method of claim 10, wherein the plurality of frequency-selective input filters passes four time-varying signals from the temperature measurement controller into corresponding nodes of the temperature sensor network and the plurality of frequency-selective output filters passes at least four attenuated distinct time-varying signals from the temperature sensor network into the temperature measurement controller.

14. The method of claim 10, wherein the plurality of frequency-selective output filters is replaced by a multiplexer coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} and passing the plurality of attenuated distinct time-varying signals from the temperature sensor network into the temperature measurement controller.

We claim:

1. A multiple temperature sensor system (120), comprising:

a temperature sensor network (180) comprising:

a plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187);

a plurality of frequency-selective input filters (184) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing a plurality of distinct time-varying signals into the temperature sensor network (180); and

a multiplexer or a plurality of frequency-selective output filters (185) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing a plurality of attenuated distinct time-varying signals out of the temperature sensor network (180); and

a temperature measurement controller (161) coupled to the temperature sensor network (180) and configured to inject the plurality of distinct time-varying signals into the temperature sensor network (180), receive the plurality of attenuated distinct time-varying signals from the temperature sensor network (180) in response to the injection, with the plurality of attenuated distinct time-varying signals being attenuated by the plurality of temperature sensing resistors (186, 187), and generate two or more substantially simultaneous temperature values from the plurality of attenuated distinct time-varying signals;

wherein each of the temperature-sensing resistors is fed with the distinct time-varying signals substantially simultaneously from at least two of the plurality of the frequency-selective filters.

2. The multiple temperature sensor system (120) of claim 1, wherein the multiple temperature sensor system (120) is adapted to be used in a Coriolis mass flow meter.

3. The multiple temperature sensor system (120) of claim 1, wherein the multiple temperature sensor system (120) is adapted to be used in a vibrating densitometer.

4. The multiple temperature sensor system (120) of claim 1, wherein:
the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and
the plurality of frequency-selective output filters (185) comprises five frequency-selective output filters (185A-185E) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161).

5. The multiple temperature sensor system (120) of claim 1, wherein:
the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and
the plurality of frequency-selective output filters (185) comprises five frequency-selective output filters (185A-185E) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161), with the five frequency-selective output filters (185A-185E) including two outputs to the temperature measurement controller (161).

6. The multiple temperature sensor system (120) of claim 1, wherein:
the multiplexer is (183) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing the plurality of attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161).

7. The multiple temperature sensor system (120) of claim 1, wherein:
the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and
the plurality of frequency-selective output filters (185) comprises eight frequency-selective output filters (185A-185H) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161).

8. The multiple temperature sensor system (120) of claim 1, wherein:
the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and
the plurality of frequency-selective output filters (185) comprises eight frequency-selective output filters (185A-185H) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161), with the eight frequency-selective output filters (185A-185H) including a single output to the temperature measurement controller (161).

9. The multiple temperature sensor system (120) of claim 1, wherein:
the plurality of frequency-selective input filters (184) comprises two frequency-selective input filters (184A, 184B) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing four time-varying signals from the temperature measurement controller (161) into corresponding nodes of the temperature sensor network (180); and

the plurality of frequency-selective output filters (185) comprises five frequency-selective output filters (185A-185E) coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} (186, 187) and passing at least four attenuated distinct time-varying signals from the temperature sensor network (180) into the temperature measurement controller (161), with the five frequency-selective output filters (185A-185E) including a single output to the temperature measurement controller (161).

10. A temperature determination method for a multiple temperature sensor system, the method comprising:

injecting a plurality of distinct time-varying signals into a temperature sensor network including a plurality of temperature-sensing resistors and a plurality of frequency-selective filters, with the plurality of frequency-selective filters comprising a plurality of frequency-selective output filters coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} and passing the plurality of distinct time-varying signals from the temperature measurement controller into the temperature sensor network and a plurality of frequency-selective input filters coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} and passing the plurality of attenuated distinct time-varying signals from the temperature sensor network into the temperature measurement controller;

receiving a plurality of attenuated distinct time-varying signals from the temperature sensor network in response to the injection, with the plurality of attenuated distinct time-varying signals being attenuated by the plurality of temperature sensing resistors, wherein each of the temperature-sensing resistors is fed with the distinct time-varying signals substantially simultaneously from at least two of the plurality of the frequency-selective filters; and

generating two or more substantially simultaneous temperature values from the plurality of attenuated distinct time-varying signals.

11. The method of claim 10, wherein the multiple temperature sensor system is used in a Coriolis mass flow meter.

12. The method of claim 10, wherein the multiple temperature sensor system is used in a vibrating densitometer.

13. The method of claim 10, wherein the plurality of frequency-selective input filters passes four time-varying signals from the temperature measurement controller into corresponding nodes of the temperature sensor network and the plurality of frequency-selective output filters passes at least four attenuated distinct time-varying signals from the temperature sensor network into the temperature measurement controller.

14. The method of claim 10, wherein the plurality of frequency-selective output filters is replaced by a multiplexer coupled to the plurality of temperature-sensing resistors R_{T1} and R_{T2} and passing the plurality of attenuated distinct time-varying signals from the temperature sensor network into the temperature measurement controller.