CLAIMS

We claim:

1. A system comprising:

an electrical signal wherein the electrical signal is driven by a real-time progressive polynomial spline evaluation of interpolated phase angle samples that achieves an up-sampling by a power-of-two factor using a linear combination;

wherein ~~dither is applied to the linear combination.~~ a result of at least one of the spline evaluation is used to control an aspect of an output electrical signal;

wherein a resulting value of the spline evaluation when added to a base frequency phase counter is used to determine a location of an output signal edge of the output digital signal;

wherein the location is perturbed by a random dither on the phase angle drawn from a uniform distribution;

wherein action of the phase dither is variable in a time domain as a conversion from phase to an output time series is naturally dependent on instantaneous frequency of the location.

2. The system of claim 1, wherein the polynomial spline has a plurality of intervals, and wherein at least one of the plurality of intervals is a base frequency period.

3. The system of claim 1, wherein the polynomial spline has a plurality of intervals, and wherein at least one of the plurality of intervals is a power-of-two count of base frequency periods.

4. The system of claim 1, wherein the polynomial spline has a plurality of intervals, and wherein at least one of the plurality of intervals is a power-of-two fraction of a base frequency period.

5. The system of claim 1, wherein the electrical signal has a phase angle, and wherein the phase angle is modified by a rolling counter incremented by a value driven by an external environmental monitoring sensor.

6. The system of claim 1, wherein the electrical signal has a phase angle, and wherein the phase angle is modified by a rolling counter decremented by a value driven by an external environmental monitoring sensor.

7. A system comprising:
an electrical signal wherein an instantaneous phase angle of the electrical signal is substantially calculated by a real-time progressive polynomial spline evaluation that achieves an up-sampling by a power-of-two factor using a linear combination of counters;
wherein ~~dither is applied to the linear combination of counters.~~ a result of at least one of the spline evaluation is used to control an aspect of an output electrical signal;
wherein an interpolated phase angle added to a base frequency phase counter used to determine the location of an output signal edge of the output electrical signal, has a further test applied to determine an update time free of possible race conditions to reinitialize random dither for its corresponding signal edge of the output digital signal.

8. The system of claim 7, wherein the polynomial spline has a plurality of intervals, and wherein at least one of the plurality of intervals is a base frequency period.

9. The system of claim 7, wherein the polynomial spline has a plurality of intervals, and wherein at least one of the plurality of intervals is a power-of-two count of base frequency periods.

10. The system of claim 7, wherein the polynomial spline has a plurality of intervals, and wherein at least one of the plurality of intervals is a power-of-two fraction of a base frequency period.

11. The system of claim 7, wherein the electrical signal has a phase angle, and wherein the phase angle is modified by a rolling counter incremented by a value driven by an external environmental monitoring sensor.

12. The system of claim 7, wherein the electrical signal has a phase angle, and wherein the phase angle is modified by a rolling counter decremented by a value driven by an external environmental monitoring sensor.

~~13. A system comprising:~~
~~a digital electrical signal having a state, wherein the state is calculated by comparing a difference between a current position in a base frequency cycle and an instantaneous phase angle to a proportion of cycle duty that would be present at the base frequency cycle;~~
~~wherein dither is applied to the base frequency cycle.~~

13. The system of claim 7, wherein the further applied test uses a contiguous subset of the binary digits of the resulting value of the spline evaluation of the interpolated phase angle samples when added to the base frequency phase counter to determine a race-condition free time.

14. The system of claim 13, further comprising a polynomial spline having a plurality of intervals, and wherein at least one of the plurality of intervals is a base frequency period.

15. The system of claim 13, further comprising a polynomial spline having a plurality of intervals, and wherein at least one of the plurality of intervals is a power-of-two count of base frequency periods.

16. The system of claim 13, further comprising a polynomial spline having a plurality of intervals, and wherein at least one of the plurality of intervals is a power-of-two fraction of a base frequency period.

17. The system of claim 13, wherein the electrical signal has a phase angle, and wherein the phase angle is modified by a rolling counter incremented by a value driven by an external environmental monitoring sensor.

18. The system of claim 13, wherein the electrical signal has a phase angle, and wherein the phase angle is modified by a rolling counter decremented by a value driven by an external environmental monitoring sensor.

19. The system of claim 13, further comprising;

using a Boolean result of the test to clock a linear feedback shift register (LFSR) to supply a new random value for the phase angle dither of its corresponding signal edge of the output digital signal.