CLAIMS:

1. A system comprising a controller operative to control a power supply which has an output electrically coupled to at least one pulsed load, wherein the controller is operative to:

obtain a signal V_{OV} informative of a voltage V_{OUT} at the output of the power supply,

obtain a signal $V_{I_{load}}$informative of an average of a current I_{load} required by the at least one pulsed load, wherein, for at least one given period of time, the current I_{load} comprises a series of pulses,

obtain a signal $V_{I_{in}}$ informative of a current I_{in} at an input of the power supply, and

control the current I_{in} such that the signal $V_{I_{in}}$ which is informative thereof, meets a predefined relationship with the signals V_{OV} and $V_{I_{load}}$.

2. The system of claim 1, wherein the amplitude of I_{in} is constant according to a stability criterion over at least part of the given period of time.

3. The system of claim 1 or of claim 2, wherein said control of the current I_{in} by the controller according to said predefined relationship induces the power supply to generate, at its output, a current I_{out} which matches an average of I_{load} according to a matching criterion over at least part of the given period of time.

4. The system of claim 3, wherein the current I_{out} is constant according to a stability criterion over at least part of the given period of time.

5. The system of any one of claims 1 to 4, wherein the voltage V_{OUT} is associated with an acceptable voltage range comprising a minimal acceptable value $V_{OUT,min}$ and a maximal acceptable value $V_{OUT,max}$, wherein the signal V_{OV} is informative of whether the voltage V_{OUT} is within the acceptable voltage range.

6. The system of claim 5, wherein, when the voltage V_{OUT} is within the acceptable voltage range, the signal V_{OV} remains within a different voltage range between a first value $V_{OV,1}$ and a second value $V_{OV,2}$.

7. The system of claim 5 or of claim 6, wherein the second value $V_{OV,2}$ is determined for a maximal average current I_{load} required by the pulsed load during given conditions of operation, such that, according to said predefined relationship, $V_{I_{in}} = V_{I_{load}}$.

8. The system of any one of claims 5 to 7, wherein, when the voltage V_{OUT} is above the maximal acceptable value $V_{OUT,max}$, the signal V_{OV} is set equal to a first maximal value $V_{OV,max}$, larger than $V_{OV,2}$.

9. The system of any one of claims 1 to 8, comprising an output capacitor electrically coupled to the output of the power supply, wherein when an average value of the current I_{load} is increased, an amplitude of discharge of the output capacitor during a pulse of I_{load} is increased, and the signal V_{OV} is decreased.

10. The system of any one of claims 1 to 9, comprising an output capacitor electrically coupled to the output of the power supply, wherein when an average value of the current I_{load} is decreased, an amplitude of discharge of the output capacitor during a pulse of I_{load} is decreased, and the signal V_{OV} is increased.

11. The system of any one of claims 1 to 10, comprising an output capacitor electrically coupled to the output of the power supply, wherein during periods of the given period of time in which I_{load} does not comprise pulses, I_{out} enables charging of the output capacitor.

12. The system of claim 11, wherein the current I_{out} which is used to charge the output capacitor, is constant according to a stability criterion over at least part of the given period of time.

13. The system of any one of claims 1 to 12, comprising an output capacitor electrically coupled to the output of the power supply, wherein, during at least one period of the given period of time in which a pulse of current I_{load} is required by the pulsed load, the power supply is operative to generate a current I_{out} and the output capacitor is operative to generate a current $I_{capacitor}$, wherein the sum of I_{out} and $I_{capacitor}$ matches an amplitude of the pulse of current I_{load} required by the pulsed load according to a matching criterion.

14. The system of any one of claims 1 to 13, wherein an input voltage provided to the power supply is down-converted only once before it is fed, at the output of the power supply, to the pulsed load.

15. The system of any one of claims 1 to 14, wherein, according to the predefined relationship, at least one of (i), (ii), (iii) or (iv) is met:

(i) the controller is operative to induce a decrease of an amplitude of I_{in} when an amplitude of V_{OV} increases;

(ii) the controller is operative to induce an increase of an amplitude of I_{in} when an amplitude of V_{OV} decreases;

(iii) the controller is operative to induce an increase of an amplitude of I_{in} when an amplitude of $V_{I_{load}}$increases; or

(iv) the controller is operative to induce a decrease of an amplitude of I_{in} when an amplitude of $V_{I_{load}}$ decreases.

16. The system of any one of claims 1 to 15, wherein the controller is operative to control I_{in} using the predefined relationship:

$$k_1 V_{I_{in}} + k_2 V_{OV} - k_3 V_{I_{load}} = V_{ref}$$

wherein k_1, k_2, and k_3 are positive parameters, and V_{ref} is a reference voltage of the controller.

17. The system of any one of claims 1 to 16, further comprising the power supply.

18. The system of any one of claims 1 to 17, further comprising the pulsed load.

19. A method comprising, for a power supply which has an output electrically coupled to at least one pulsed load:

generating a signal V_{OV} informative of a voltage V_{OUT} at the output of the power supply,

generating a signal $V_{I_{load}}$ informative of an average of a current I_{load} required by the at least one pulsed load, wherein, for at least one given period of time, the current I_{load} comprises a series of pulses,

generating a signal $V_{I_{in}}$ informative of a current I_{in} at an input of the power supply,

feeding the signal V_{OV}, the signal $V_{I_{load}}$ and the signal $V_{I_{in}}$ to a controller of the power supply, and

controlling, by the controller, the current I_{in} such that the signal $V_{I_{in}}$ which is informative thereof, meets a predefined relationship with the signals V_{OV} and $V_{I_{load}}$.

20. The method of claim 19, wherein the amplitude of I_{in} is constant according to a stability criterion over at least part of the given period of time.