However, speed control based on the nominal curve chart of a pump is impaired by certain disadvantages. It is a disadvantage that the curve chart of a pump model is not necessarily exactly the same for each pump entity within this pump model; furthermore, the nominal curve chart of the pump model is static over time, which is not true for the real curve chart of the specific pump entity. More precisely, the real curve chart of the pump entity will be changed concurrently with the parts of the pump being worn, which entails that the optimum current feed frequency/pump speed of the pump entity does not coincide with the optimum current feed frequency/pump speed of the pump model. In addition, the design of the pump station and the surrounding pipe system will make effect on the real curve chart of the pump entity, which effect may be difficult or impossible to anticipate and/or calculate.

Today, there are devices that measure pumped liquid volume and energy consumption at specific current feed frequencies/pump speeds, see, for instance, WO2009/053923. However, it is expensive and complicated to measure pumped liquid volume and there is a need of extra equipment intended only for the purpose of measuring pumped liquid volume.

Summary ~~Brief Description of Objects and Features~~ of the Invention

Embodiments of t~~T~~he present invention seek to~~aims at~~ obviati~~ng~~e the above-mentioned disadvantages and failings of previously known methods for controlling at least a part of a pump station and to~~at~~ provid~~ing~~e an improved method. Embodiments~~A primary object~~ of the invention seek~~is~~ to provide an improved method for controlling at least a part of a pump station of the initially defined type, which does not require that the pumped liquid volume needs to be measured.

Embodiments~~Another object~~ of the present invention seek~~is~~ to provide a method for controlling at least a part of a pump station,

which is self-regulating concurrently with the parts of the pump being worn and replaced, as well as is self-regulating based on the design of the pump station and the surrounding pipes.

Embodiments~~Another object~~ of the present invention seek~~is~~ to provide a method that in a preferred embodiment indirectly takes the size of the pumped volume into consideration without measuring the same.

~~Brief Description of the Features of the Invention~~

According to an aspect, there is provided a method for controlling at least a part of a pump station comprising a number of speed controlled pumps, the method being arranged to minimize the specific energy consumption E_{spec} of said at least a part of a pump station,~~the invention, at least the primary object is achieved by the initially defined method, which is~~ characterized in that the same comprises a sub method (Find V3) comprising the steps of

* obtaining input data in the form of a set of parameters corresponding to a fictitious or elapsed first operating period t1 and a fictitious or elapsed second operating period t2,
* determining, based on said set of parameters, the mutual relative relationship between a first value A1 of a quantity that corresponds to a first pump speed V1 and that is derived based on said set of parameters, which first value A1 relates to said first operating period t1, and a second value A2 of said quantity that corresponds to a second pump speed V2 and that this derived from said set of parameters, which second value A2 relates to said second operating period t2, and between a first specific energy consumption $E_{spec}1$ that is derived based on said set of parameters and that relates to said first operating period t1, and a second specific energy consumption $E_{spec}2$ that is derived from said set of parameters and that relates to said second operating period t2,

* determining, based on said determined mutual relative relationships and on parameters B3, B4, B5, and B6 of said quantity, output data in the form of a third value A3 of

said quantity corresponding to a third pump speed V3 of a third operating period t3, wherein A3 is set equal to A2-B3 if the conditions A2<A1 and $E_{spec}2<E_{spec}1$ are satisfied, A3 is set equal to A2+B4 if the conditions A2>A1 and $E_{spec}2<E_{spec}1$ are satisfied, A3 is set equal to A2+B5 if the conditions A2<A1 and $E_{spec}2>E_{spec}1$ are satisfied, and A3 is set equal to A2-B6 if the conditions A2>A1 and $E_{spec}2>E_{spec}1$ are satisfied.

Accordingly, embodiments of the present invention are~~is~~ based on the understanding that the sum of the pumped liquid volume during a certain period of time, for instance 24 h or a multiple of 24 h, is more or less constant as seen over a longer period of time.

Preferred embodiments of the present invention are furthermore defined in the dependent claims.

Preferably, the set of parameters comprises said first value A1 of said quantity and the associated first specific energy consumption $E_{spec}1$, as well as said second value A2 of said quantity and the associated second specific energy consumption $E_{spec}2$.

Preferably, the first value A1 of said quantity consists of the pump speed V1 or a first current feed frequency F1, and the second value A2 of said quantity consists of the pump speed V2 or a second current feed frequency F2, and the third value A3 of said quantity consists of the pump speed V3 or a third current feed frequency F3.

Additional advantages and features of the invention are seen in the other dependent claims as well as in the following, detailed description of preferred embodiments.

Brief Description of the Drawings

A more complete understanding of the above-mentioned and other features and advantages of the present invention will be clear from the following, detailed description of