老叶说事
《高阶会员专属-第6期》

IEEE期刊论文导读：永磁同步电机Sensorless方法总回顾，让你见树也见林！

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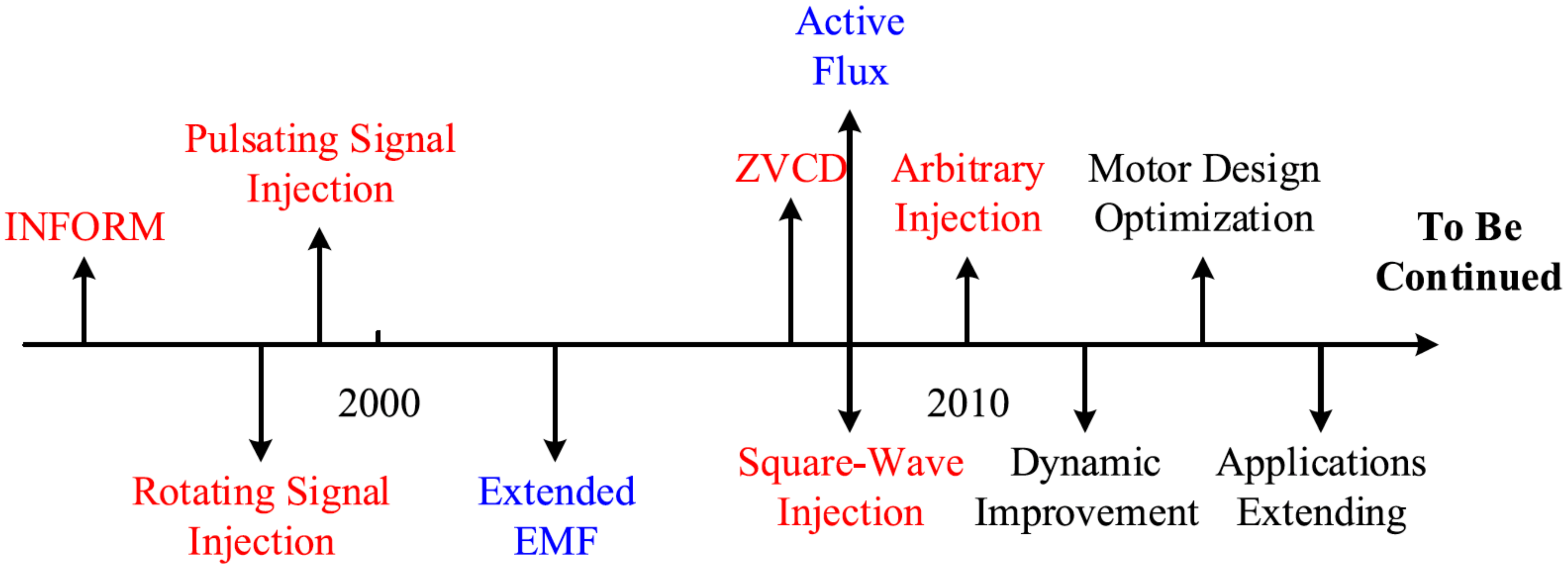

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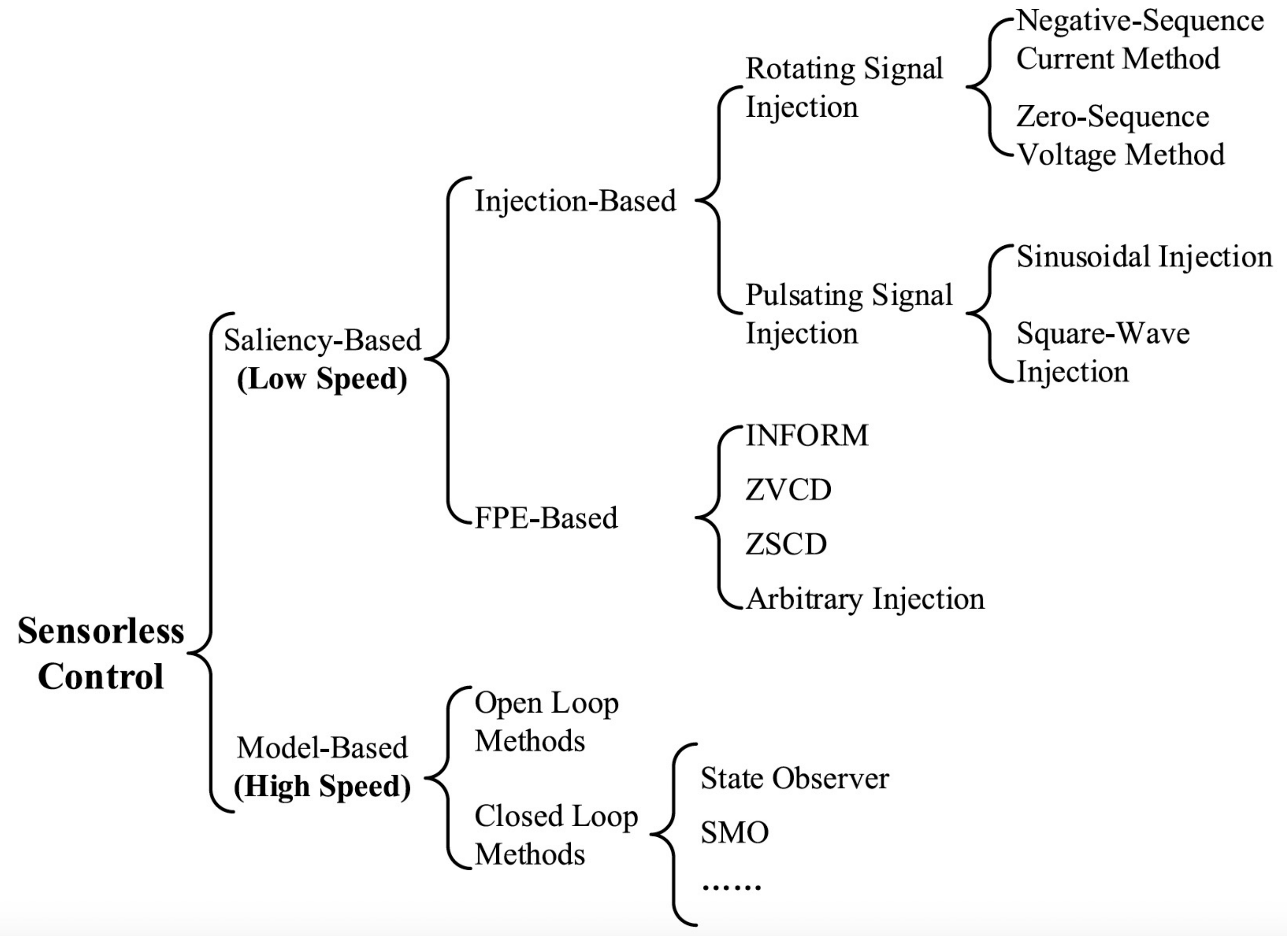

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control applied in high-speed range and saliency-based sensorless control applied in low-speed range. Model-based method can be implemented using the electromotive force (EMF) or flux associated with the fundamental excitation [3]–[63], and it can be subdivided into open-loop methods and closed-loop methods. The former is derived through the integration of the back EMF of the machine without any correction term while the latter makes use of the error between the estimated and measured quantities as feedback to increase their performance [63]. Although model-based method was proposed and commercialized first, it fails in the low-speed range due to the low signal-to-noise-ratio caused by modeling uncertainty, inverter nonlinearity, etc.

To expand the sensorless control into the low- to-zero speed range, the saliency tracking-based method has been developed, including signal injection-based methods [64]–[112] and fundamental pulsewidth modulation (PWM) excitation (FPE)-based methods [40], [113]–[135].

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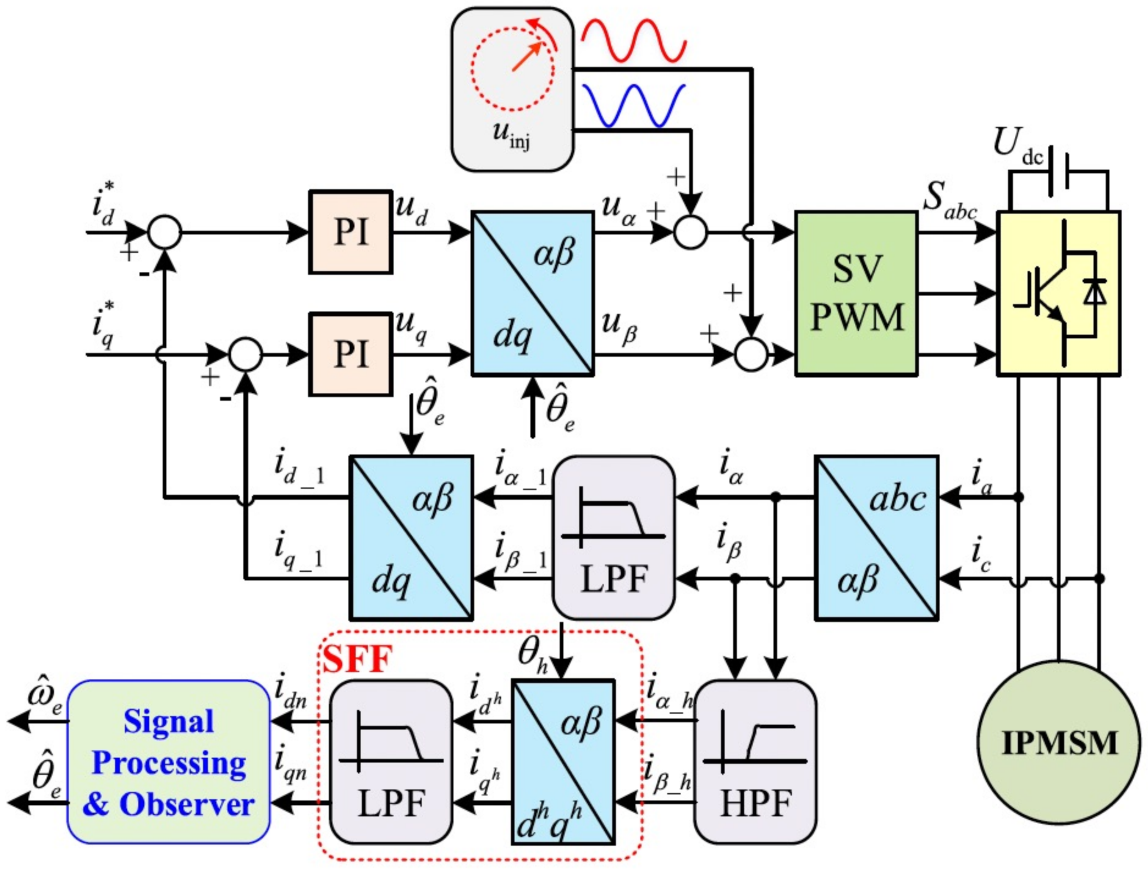


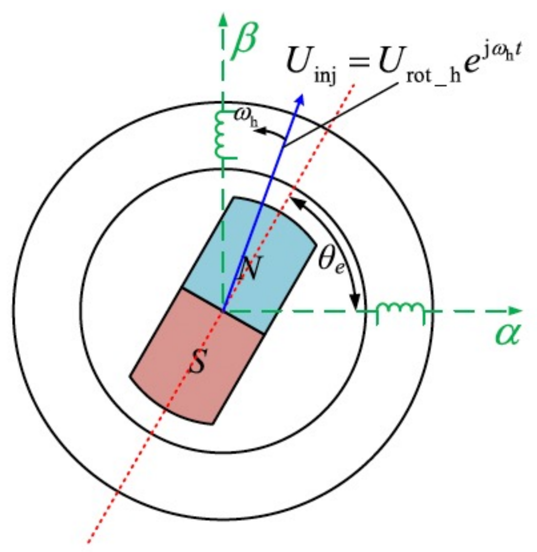
Injection Scheme	Rotating Signal Injection
Injection Frame and Signal	$\alpha\beta$ Frame
Block Diagram	

Fig. 2. Block diagram of rotating signal injection.

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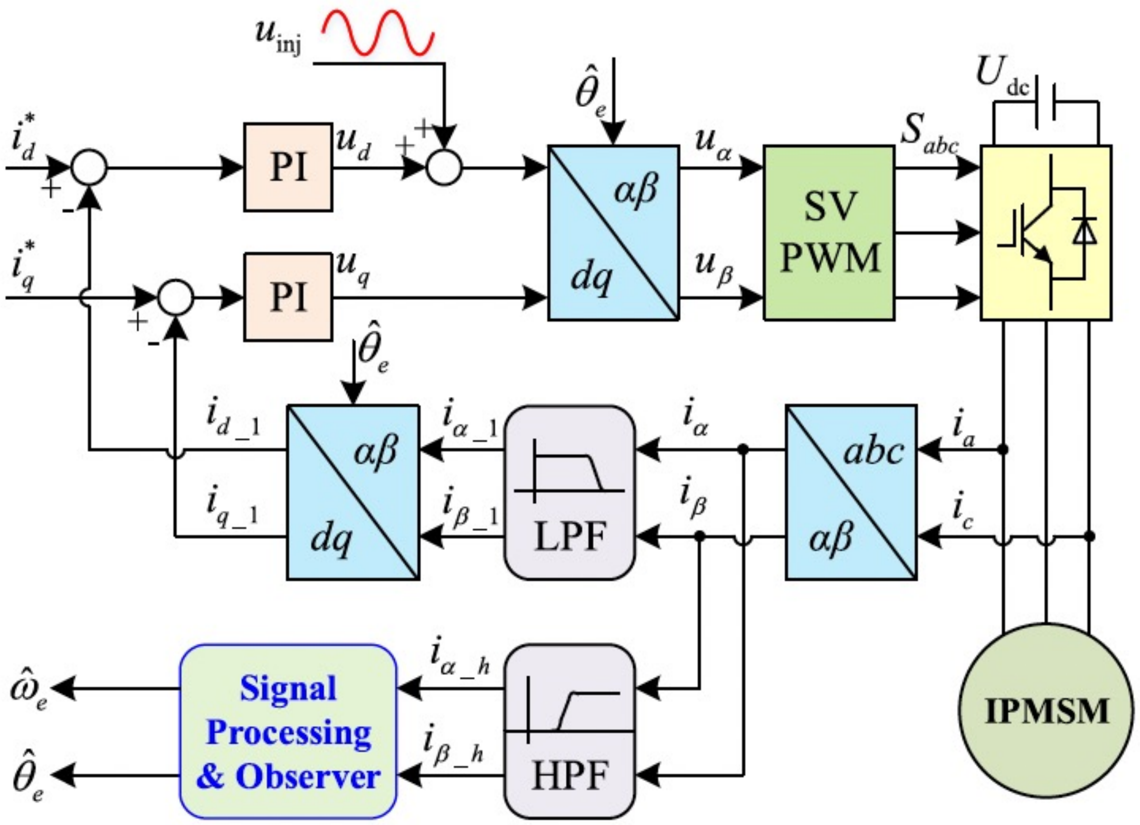

Fig. 4. Block diagram of pulsating sinusoidal injection.