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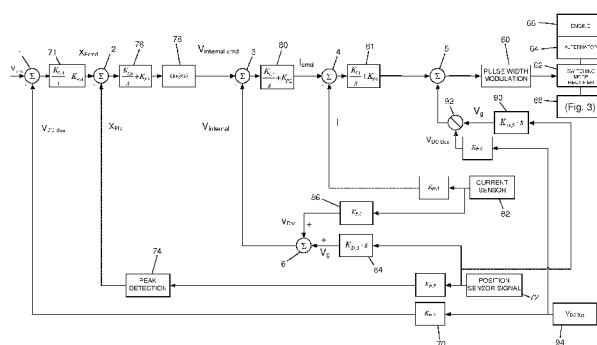
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(54) Title: ELECTRONIC CONTROLLER MATCHING ENGINE POWER TO ALTERNATOR POWER AND MAINTAINING ENGINE FREQUENCY FOR A FREE-PISTON STIRLING ENGINE DRIVING A LINEAR ALTERNATOR



(57) Abstract: A feedback control method and circuit for inclusion in a control system of an electrical power generating source that comprises a free piston Stirling engine driving a linear alternator. An instantaneous value of a variable, $V_{jntemai}$, is continuously derived from other sensed and computed parameters and used in a negative feedback control loop of the control system to control engine piston stroke in order to maintain the power produced by the engine equal to the power transferred from the engine to the alternator. V_{ntemai} is the sum of the voltage induced on the alternator winding and the voltage across the equivalent circuit lumped resistance of the alternator winding. A switching mode rectifier connects the alternator winding to an energy storage capacitor or battery. A negative feedback, alternator current control loop has an output connected to the pulse width modulator of the switching mode rectifier and has a feedback circuit comprising a current sensor for sensing instantaneous alternator current. A negative feedback, V_{ntemai} control loop has a feedback circuit including a piston position or velocity sensor connected to a computing circuit that the current sensor is also connected to. The computing circuit computes a signal representing V_{ntemai} for use as the feedback signal of the $V_{jntemai}$ control loop. The output of the V_{ntemai} control loop is connected as the command input to the current feedback control loop.



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