The Design of an Electric Fence Fault-Finder

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Abstract

Electrified fencing is commonly used throughout the world to control animals with smaller and cheaper fence constructions than would otherwise be necessary with non-electrified wires. Typical installations have a long wire or wires starting from an electric fence energiser and then surrounding fields in various complex configurations. Faults on electric fences can be difficult to locate, with the average fence using tens of kilometres of wire.

Basic fault-finding tools allow an operator to read the peak fence voltage, requiring the user to decide whether a fault is present and to randomly search for the source of the problem. The focus of this thesis is to develop a device that reduces the time to locate faults on a fence by providing more information about the location and nature of a fault, and will point in the direction of the fault.

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Symbols and Abbreviations

F	Frequency [s^{-1}]
Hz	Hertz [s^{-1}]
kHz	Kilohertz [s^{-1}]
MHz	Megahertz [s^{-1}]
E	Stored Energy [J]
L	Inductance [H]
H	Henry
mH	MilliHenry
C	Capacitance [F]
Q	Capacitor charge
F	Farad
pF	PicoFarad
nF	NanoFarad
µF	MicroFarad
G	Conductance
R	Resistance [Ω]
V	Voltage
V_{out}	Voltage Output
V_{in}	Voltage Input
mV	Millivolt
kV	Kilovolt
V_p	Peak Voltage
V_{RMS}	Voltage, Root Mean Square
I	Current [A]
I_{out}	Current Output [A]
I_{in}	Current Input [A]
A	Amp
µA	MicroAmp
mA	MilliAmp
I_p	Peak Current

t	Time [s]
s	Second
ms	MilliSecond
μs	MicroSecond
km	Kilometre
m	Metre
cm	Centimetre
h	Height [m]
r	Radius [m]
A	Area [m^2]