

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202331087041 A

(19) INDIA

(22) Date of filing of Application :19/12/2023

(43) Publication Date : 23/02/2024

(54) Title of the invention : SYSTEM AND METHOD TO MEASURE MAGNETIC FIELD USING GMR SENSOR AND A LINEARIZING FASTER DIGITIZER

(51) International classification	:G01R0033090000, B82Y0025000000, H03M0001520000, G01R0033000000, G01N0027740000	(71)Name of Applicant : 1)INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD Address of Applicant :Dhanbad - 826004, Jharkhand, India Dhanbad -----
(86) International Application No	:NA	Name of Applicant : NA
Filing Date	:NA	Address of Applicant : NA
(87) International Publication No	: NA	(72)Name of Inventor :
(61) Patent of Addition to Application Number	:NA	1)Kishor Bhaskarrao Nandapurkar
Filing Date	:NA	Address of Applicant :Room No. 108, Dept. of Electrical Engineering, New Academic Complex, IIT (ISM) Campus, Dhanbad – 826004, Jharkhand, India Dhanbad -----
(62) Divisional to Application Number	:NA	2)Shouvik Saha
Filing Date	:NA	Address of Applicant :Katjuridanga, Vidyasagarpally, Bankura – 722102, West Bengal, India Vidyasagarpally -----

(57) Abstract :

This invention relates to a system (100) and a method (900) to measure magnetic field using Giant Magneto Resistance (GMR) based magnetic field sensor and a digitizer. Said system (100) comprises a GMR sensor (102) comprising a Wheatstone Bridge arrangement, and a digitizer (104) coupled with the GMR sensor (102), configured to determine an output magnetic field (DOU) based on the first voltage (VG) which is a non-linear function of the input magnetic field (Bm), wherein the digitizer (104) comprises a plurality of switches (S1, S2, S3), a buffer block (106), and an enhanced dual-slope based digital signal conditioning circuit (113) comprising an integrator circuit (108), a comparator circuit (110), and a Control, Timing, and Processing Unit (CTPU) (112). The proposed work facilitates the magnetic field measurement using only two internal resistances of the sensor. This helps to minimize the dependency of measurement accuracy/linearity on four sensor resistances. It presents a faster digitizer that accepts non-linear analog voltage output from the sensor and renders a linear direct-digital output with-respect-to the magnetic field. The digitizer implements a simple ratio metric operation using a modified dual slope-based circuit to obtain a direct-digital indication of the input magnetic field.

No. of Pages : 35 No. of Claims : 9