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On minimal bi-ideal elements of an le -semigroup

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Abstract

Here we study the minimal bi-ideal elements and minimal quasi-ideal elements of an le -semigroup S as a generalization of minimal bi-ideals and minimal quasi-ideals. Several necessary and sufficient conditions for a bi-ideal element [quasi-ideal element] of S to be minimal have been studied. We show that a minimal bi-ideal element b of S is precisely of the form $b = ca$ for some minimal right ideal element c and some minimal left ideal element a of S . Also we discuss different kinds of simplicity of them in an le -semigroup.

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Ethics declarations

Conflict of interest

The authors declare that they have no conflict of interest.

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Editorial.....



Climate Literacy

Human-induced climate change is causing dangerous and widespread disruption in nature and affecting the lives of billions of people around the world, despite efforts to reduce the risks. The world faces unavoidable multiple climate hazards over the next two decades with global warming of 1.5°C (2.7°F). Even temporarily exceeding this warming level will result in additional severe impacts, some of which will be irreversible. Risks for society will increase, including to infrastructure and low-lying coastal settlements. Increased heatwaves, droughts and floods are already exceeding plants' and animals' tolerance thresholds, driving mass mortalities in species such as trees and corals. These weather extremes are occurring simultaneously, causing cascading impacts that are increasingly difficult to manage. They have exposed millions of people to acute food and water insecurity, especially in Africa, Asia, Central and South America, on Small Islands and in the Arctic. Scientists point out that climate change interacts with global trends such as unsustainable use of natural resources, growing urbanization, social inequalities, losses and damages from extreme events and a pandemic, jeopardizing future development. Climate literacy explores future impacts at different levels of warming and the resulting risks and offers options to strengthen nature's and society's resilience to ongoing climate change, to fight hunger, poverty, and inequality and keep Earth a place worth living on – for current as well as for future generations. Climate education empowers all people, but especially motivates the young to take action. Climate change education is an urgent need. It can make society aware of change and protect the Earth and its environment from dangerous inputs. Through this education, factors such as individual human morality, living in harmony with nature, conservation of biodiversity will be protected. Climate change education should be widely disseminated to the public through colleges, schools, public service institutions, research centers, village administrations, etc. and appropriate personal training should be provided.

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Article

A 3D Coordination Polymer Based on *syn-anti* Bridged [Mn(RCOO)₂]_n Chains Showing Spin-Canting with High Coercivity and an Ordering Temperature of 14 K

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Abstract: A new 3D manganese(II) coordination polymer, formulated as [Mn₃(HL)₆] (1) (where H₂L = 6-hydroxypicolinic acid), has been hydrothermally synthesized and characterized by single-crystal X-ray crystallographic analysis along with other spectroscopic and magnetic techniques. Structural analysis shows that the compound crystallizes in the monoclinic C2/c space group and is a non-porous 3D coordination polymer formed by three different Mn(II) centres connected by 6-hydroxypicolinic acid ligands in their *keto* form. Each Mn(II) centre shows a distorted octahedral coordination environment. Neighbouring Mn(II) centres are connected by two different *syn-anti* bridging carboxylate groups to form regular coordination chains. There are two different [Mn₂(RCOO)₂] units along the chain, formed by two crystallographically independent Mn centres (Mn1 and Mn2). These chains are further connected by HL⁻ ligands to form a 3D coordination network. Interestingly, both the hydroxy and the carboxylate groups of the ligands are deprotonated and coordinated to the metal centres, whereas the pyridyl group is protonated and uncoordinated, although it participates in strong hydrogen bonding interactions with oxygen atoms of the HL⁻ ligand, as shown by the Hirshfeld surface analysis. Both the absorption and emission spectra of the compound have also been measured. Variable temperature magnetic studies reveal the presence of a spin-canted antiferromagnetic behaviour with a high coercivity of 40 mT at 2 K and an ordering temperature of 14 K.

Keywords: 3D coordination polymer; manganese(II); 6-hydroxypicolinic acid; keto-enol tautomerism; *syn-anti* carboxylate; spin-canting; magnetic properties

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1. Introduction

The design of metal-organic coordination polymers has gained much attention for their tuneable structural features and enormous functionalities [1–5]. The search for different molecule-based magnets that show spontaneous magnetization below a critical temperature has also been an attractive field of research [6–11]. Thus, many types of magnetic coordination polymers with different topologies and dimensionalities have been developed, and their magnetic properties have been studied [12–15]. In most cases, mixed N,O-donor ligands are used to create a magnetic exchange pathway between the paramagnetic metal centres in those polymeric materials [16–19]. Albeit, it is still very difficult to control and predict the geometry and magnetic behaviour of the polymers due to the diverse coordination modes of many ligands and the sensitivity of the magnetic interactions to slight structural modifications [20–22]. Among the different strategies used to design magnetic materials, the most successful ones are: (i) the use of isolated magnetic building blocks to design extended structures [23,24], (ii) the use of radical-based bridging ligands [25–27], and (iii) the synthesis of magnetic molecules inside the cavity of metal-



Novel ensemble of deep learning neural network and support vector machine for landslide susceptibility mapping in Tehri region, Garhwal Himalaya

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ABSTRACT

Over the years, landslide has become one of the most destructive events that can happen in hilly areas. Tehri, a region in the Himalayas is no different. Current research aids in the construction of ensemble models of DLNN and SVM, which are then compared with various SVM kernels. Landslide susceptibility mapping in the Tehri region of the Himalayas has been worked upon using a deep learning (DLNN), four machine learnings (SVM-RBF, SVM-Linear, SVM-Polynomial, SVM-Sigmoid), and their novel ensembles i.e., DLNN with SVM-RBF, DLNN with SVM-Linear, DLNN with SVM-Polynomial and DLNN with SVM-Sigmoid. 16 geo-environmental landslide conditioning factors (LCFs) have been considered. These models were trained using 70% of inventory landslides and tested using 30% of the same. The results revealed the superiority of DLNN, DLNN-SVM (RBF), DLNN-SVM (Linear) models which quantified 28.32, 26.96 and 22.41% of the area highly susceptible for landslide, respectively.

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KEYWORDS

Landslide susceptibility map; deep learning algorithms; Tehri region; ensemble model; kernels

1. Introduction

Landslides, mainly in the hilly regions, are the significant environmental disasters that cause the demolition of natural and human habitats, roads and other transport routes, upland agriculture, deforestation, and several other economic and cultural structures. In the field of Engineering Geology, landslides are defined as the downhill movement of mass material on a slope (Mandal et al. 2021). Globally, hilly regions are intensely influenced by landslide events due to high instability of landmasses over the slope (Conforti and Ietto 2019). In India, states and union territories (UTs) around the Himalayan mountainous belts like Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Northern part of West Bengal, Sikkim and North-Eastern states are rigorously affected by the landslides. Mainly the landslides are the product of a large multiplicity of geo-environmental processes which entail meteorological, geological and anthropogenic factors. The key factors which affect landslides were talked about by Kornejady et al. (2015) and Nepal et al.



Spatial accessibility modeling to healthcare facilities in the case of health shocks of Midnapore municipality, India

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Abstract This research aims to identify the accessibility of the entire population, especially the slum population to existing healthcare facilities (HCF) as well as the slum neighborhoods having low geographic accessibility, and finally, to provide an analytical model for the people living in areas that are outside the coverage range of existing healthcare facilities (HCF) across the study area. Spatial data has been collected and used based on the road network, elevation, location of HCF, municipal boundary, slum point, and satellite images from various sources. Also, non-spatial data such as socioeconomic variables are collected from questionnaires survey within

a particular period. The spatial analysis tool like as near, network analysis, and predictive analysis in the ArcGIS platform was used to examine geographic accessibility. The results of the spatial analysis show that the distribution of public healthcare facility centers in the study area has not been uniformly distributed. Across 84% of areas in the study area have sound spatial accessibility with traveling time coverage is about 12 min. However, 16% of areas have a traveling time of 12 to 30 min under low accessibility with existing slum neighborhoods. Therefore, the low spatial accessibility areas are demanding new healthcare facilities in the study area. The Analytical Hierarchy Process (AHP) is employed to find the most optimal and efficient locational suitability for building new healthcare facility centers. The finding of AHP analysis for site suitability of healthcare facilities revealed five major classes as most suitable (2%), suitable (5%), moderate (35%), poor (54%), and very poor (4%) in the study area. Moreover, the realistic framework of this study helps to measure geographic accessibility and suitability in any geographical area.

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Keywords Geographic accessibility · Network analysis · Healthcare facility (HCF) · Predictive analysis · Analytical hierarchy process (AHP) · Midnapore municipality