



Cornel Ilinca

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Address: Bd. Lacul Tei nr. 122 - 124, 020396, Bucuresti, Romania (Work)

WORK EXPERIENCE

 **TECHNICAL UNIVERSITY OF CIVIL ENGINEERING BUCHAREST** – BUCURESTI, ROMANIA

Business or Sector Education | **Department** Hydrotechnical Engineering |

Address Bd. Lacul Tei nr. 122 - 124, 020396, Bucuresti, Romania | **Email** cornel@utcb.ro | **Website** <https://utcb.ro/en/>

UNIVERSITY ENGINEERING LECTURER – 01/10/2001 – CURRENT

Research in Hydrologic and Water Resource Modeling, Hydraulic Structures, Earthquake Engineering and Natural hazards in coastal regions.

Teaching classes in Faculty of Hydrotechnics, Technical University of Civil Engineering of Bucharest.

EDUCATION AND TRAINING

01/10/1997 – 15/04/2003 Bucuresti, Romania

DOCTOR OF ENGINEERING Technical University of Civil Engineering of Bucharest

Resume of doctoral thesis.

Early problem identification is made possible by neural networks' ability to detect minor changes in structures like levees and seawalls through the analysis of time series recorded data. Proactive monitoring and maintenance are made possible by time series models that indicate trends in dam deformations, such as exponential smoothing, EdF, and ARIMA.

Statistical models and neural networks offer a way to increase precision, and decision-making when it comes to hydrotechnical structure behaviour.

Address Bd. Lacul Tei nr. 122 - 124, 020396, Bucuresti, Romania | **Website** <https://utcb.ro/en/> |

Field of study Engineering, design and construction |

Thesis Application of the neural network and the statistical models in hydraulic construction surveying

01/10/1995 – 30/06/1996 Bucuresti, Romania

ADVANCED STUDIES IN HYDROINFORMATICS Technical University of Civil Engineering of Bucharest

Address Bd. Lacul Tei nr. 122 - 124, 020396, Bucuresti, Romania | **Website** <https://utcb.ro/en/>

01/10/1990 – 30/06/1995 Bucuresti, Romania

ENGINEER University Of Agronomic Sciences And Veterinary Medicine Of Bucharest

Address Bulevardul Mărăști Nr. 59, Sector 1, , 011464, Bucuresti, Romania | **Website** <https://www.usamv.ro/index.php/en/>

LANGUAGE SKILLS

Mother tongue(s): **ROMANIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	B2	B2	C1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

● SKILLS

Mathcad | MATLAB | HEC-RAS | HEC-HMS | AutoCAD | QGIS | Microsoft Office | C++ | SAP2000 | GeoStudio | HEC-HMS (SMA Deficit and Constant Green-Ampt SCS) | Eureka | Smath studio

● PROJECTS

CURRENT

Development and design of small hydropower plants

● GUEST EDITOR

Journal of Applied Sciences MDPI

- **Emerging Concrete Technologies and Applications**
- **Novel Approaches for Water Resources Assessment**

Links https://www.mdpi.com/journal/applsci/special_issues/TJ7WZVMOX4 | https://www.mdpi.com/journal/applsci/special_issues/T2529A1SHR

● RESEARCH

Study on Hydropower Retrofitting Potential in Romania and Study of Pumped Hydro Energy Storage Potential in Romania

<https://www.infoclima.ro/acasa/modernizarea-hidrocentralelor-o-cale-spre-energie-curat-i-independennbspenergetic>

Link <https://wwf.ro/wp-content/uploads/2025/03/Studiu-privind-potentialul-de-retehnologizare-a-hidrocentralelor-din-Romania.pdf>

● REVIEWER

Journals and scientific events of the following publishers and journals

- MDPI Publishing (Applied Sciences, Water, Journal of Marine Science and Engineering, Hydrology, Mathematics, Smart Cities, Sustainability, Remote Sensing, Energies, Design, Geographies, Climate, Foundations, Oceans, Geosciences, Axioms, Symmetry);
- WILEY Publishing (Journal of Flood Risk Management, Journal of Advanced Transportation);
- SPRINGER Publishing (Natural Resources Research);
- Public Library of Science (PLOS ONE);
- Inderscience Enterprises Ltd. (International Journal of Hydrology Science and Technology);
- ELSEVIER Publishing (Journal of Hydrology – Regional Studies).

● PUBLICATIONS

2023

[Flood Frequency Analysis Using the Gamma Family Probability Distributions](#)

Authors: Cornel Ilinca, Cristian-Gabriel Anghel

This article presents six probability distributions from the gamma family with three parameters for the flood frequency analysis in hydrology. The choice of the gamma family of statistical distributions was driven by its frequent use in hydrology. In the Faculty of Hydrotechnics, the improvement of the estimation of maximum flows, including the methodological bases for the realization of a regionalization study with the linear moments method with the corrected parameters, was researched and is an element of novelty. The linear moments method performs better than the method of ordinary moments because it avoids the choice of skewness depending on the origin of the flows, and is the method practiced in Romania. The L-moments method conforms to the current trend for estimating the parameters of statistical distributions. Observed data from hydrometric stations are of relatively short length, so the statistical parameters that characterize them are of a sample that requires correction. The correction of the statistical parameters is proposed using the method of least squares based on the inverse functions of the statistical distributions expressed with the frequency factor for L-moments. All the necessary elements for their use are presented, such as quantile functions, the exact and approximate relations for estimating parameters, and frequency factors. A flood frequency analysis case study was carried out for the Ialomita river to verify the proposed methodology. The performance of this distributions is evaluated using Kling-Gupta and Nash-Sutcliffe coefficients.

2023

[Frequency Analysis of Extreme Events Using the Univariate Beta Family Probability Distributions](#)

Authors: Cornel Ilinca, Cristian-Gabriel Anghel

This manuscript presents three families of distributions, namely the Beta, Beta Prime and Beta Exponential families of distributions. From all the distributions of these families, 14 statistical distributions of three, four and five parameters are presented that have applicability in the analysis of extreme phenomena in hydrology. These families of distributions were analyzed regarding the improvement of the existing legislation for the determination of extreme events, specifically the elaboration of a norm regarding frequency analysis in hydrology. To estimate the parameters of the analyzed distributions, the method of ordinary moments and the method of linear moments were used; the latter conforms to the current trend for estimating the parameters of statistical distributions. The main purpose of the manuscript was to identify other distributions from these three families with applicability in flood frequency analysis compared to the distributions already used in the literature from these families, such as the Log-logistic distribution, the Dagum distribution and the Kumaraswamy distribution. The manuscript does not exclude the applicability of other distributions from other families in the frequency analysis of extreme values, especially since these families were also analyzed within the research carried out in the Faculty of Hydrotechnics and presented in other materials. All the necessary elements for their use are presented, including the probability density functions, the complementary cumulative distribution functions, the quantile functions and the exact and approximate relations for estimating parameters. A flood frequency analysis case study was carried out for the Prigor River, to numerically present the proposed distributions. The performance of these distributions was evaluated using the relative mean error, the relative absolute error and the L-skewness-L-kurtosis diagram. The best fit distributions are the Kumaraswamy, the Generalized Beta Exponential and the Generalized Beta distributions, which presented a stability related to both the length of the data and the presence of outliers.

2022

Methodology for determining hydromorphological indicators for rivers with hydropower uses

Authors: Stefan Stanca, Alexandru Dimache, Cornel Ilinca, Cristian-Gabriel Anghel

The ecological condition of rivers is influenced by hydropower uses. The European Union encouraged the hydropower sector with installed capacities less than 10 MW, considering that their impact is small. Small hydropower plants influence the main hydromorphological indicators, namely the hydrological regime, the longitudinal connectivity of the river and the morphological conditions. This article proposes a methodology in which hydromorphological indicators take into account the dynamics of the phenomena and processes involved, due to the variation over time of the causes and effects. The methodology proposes a score based on linear interpolation, completing the threshold values, thus being able to differentiate the negative impact on rivers. The article proposes also a series of measures to reduce the negative impact of small hydropower plants.

2022

Flood-Frequency Analysis for Dams in Romania

Authors: Cornel Ilinca, Cristian-Gabriel Anghel

Accurately determining the maximum designed water discharges of dams is extremely important, considering the economic costs of carrying out these types of hydrotechnical works and the possible disastrous consequences resulting from their incorrect design. This article describes and applies probability distributions used in hydrology, with some recommended by Romanian legislation standard NP 129-2011. The methods for estimating the parameters presented in this article, as well as the establishment of directions for correlating the normative with international regulations, resulting from the research on many rivers with different characteristics, conducted within the Faculty of Hydrotechnics, were completed with specialized computer applications for applying the normative. In this article, two case studies reflecting this research are presented. The verification of the proposed recommendations, on rivers with hydrographic basins with different physiographic characteristics, confirmed the opportunity to implement rigorous and simple criteria. The presentation of the quantile form of some distributions (especially Pearson III) and of the expressions of moments (central and raw) of high order, as well as the presentation of the frequency factors of each analyzed distribution necessary to calculate the confidence interval, constitute novelties, thus facilitating the ease of use of these distributions.

2019

Breach Forming Scenarios at Concrete Faced Rock-fill Dams

Authors: Alina Popescu-Busan, Cornel Ilinca, Serban Nicoara, Albert Constantin, Cristian Anghel

Rock-filled dams with reinforced concrete facing, as the proposed study case of Bolboci Dam on the River Ialomița, Dâmbovița County, centre Romania, are characterized by a very high operation safety. On the international level, there is no record of failed concrete faced rock-fill dams. However, during their usage there have been several incidents mainly due to the unsatisfactory behaviour of the reinforced concrete masks. Specifically, in an ICOLD statistic that presented 17 cases of damages to rock-fill dams with reinforced concrete facing, 14 were due to the unsatisfactory behaviour of the reinforced mask. The other 3 cases were due to piping phenomena or percolation through the dam foundation or the lake's shore. The failure scenarios of this dam type, Bolboci Dam including, can be as follows: the retaining structure over-spilling during floods due to an insufficient or poor operation of top and/or bottom dischargers - the overflow gradually erodes the body of the dam until the breach occurs; concentrated infiltrations with

a high gradient through the dam body as a result of a serious malfunction in the concrete facing sealing, with material carving in, leading to breaches in the dam body; piping in the dam foundation / side banks that could finally lead to slippage and finally dam failure (improbable due to the existing geotechnical conditions); overpassing the safety guard of the dam's crown leading to the dam over-discharging as a result of irreversible excessive subsidence due to exceptional incidents. There have been studies on three statistical methods on how characteristic breaches occur: MLM Empirical Method, Washington State and Froehlich. The Froehlich method has been endorsed and modified, because Bolboci Dam is a well built, well executed and a well employed dam. The failure hypotheses of the dam were done with applications using MathCAD software, their algorithm being based on the finite differences method. It must be specified that the statistical approach of dam failure is a trap, due to the fact that it is well known they are a work of one of a kind engineering art. This fact shows the difficulty of the elaboration of the failure scenarios and the need of a sensitivity study for the comparison of the scenarios. The results show that the failure of rock-filled dams with reinforced concrete facing is highly improbable and leads to small flows with a sluggish evolution of the breaches.

2017

Study for Selecting the Solution of a Dam's Discharge Chute Canal

Authors: Felipe Cisneros, Erwin Barahona, Cornel Ilinca, Cristian Anghel

Some hydraulic studies to find an adequate solution for a discharge chute canal are presented in this paper. The chute canal is appropriate work of the Lechugal 2 earth dam ($H=20$ m), which is part of a large irrigation system from Ecuador, presently under construction.

Studies have consisted in experiments on hydraulic model of the chute canal built at geometrical scale 1:35 and by numerical simulations in one-dimensional steady flow running HecRas software. In first stage numerical model was calibrated based on experiment results and in second stage other three constructive variants of the chute canal were analysed numerically in order to improve the solution settled by hydraulic model.

The technical performances of each variant settled by these experimental and numerical studies follow to be completed with economical analyses which will allow designer to choose the best solution for discharge chute canal.

2017

Assessment Concerning the Domain of Applicability of Protodiakonov Method in Calculus of Underground Structures

Authors: Adrian Popovici, Cornel Ilinca, Cristian-Gabriel Anghel

The sectional stresses (M , N) in a gallery lining are computed comparatively numerical by FEM taking into account the interaction underground structure - surrounding ground and analytical by Protodiakonov method. The last method is based on coincidence arch born in ground over gallery. Comprehensive analyses allow to settle the domain in which Protodiakonov method can be applied as well as the conditions in which discharge arches appear in ground above underground or embedded structures. The study is available for galleries (tunnels) built so that their lining takes loads from undeformed ground (rock) mass surrounding gallery, existent before excavation.

2016

The Effects of the Structure—Foundation Interaction in the Structural Response of a TBM Gallery

Authors: Cisneros Felipe, Juan Pablo Cabrera, Juan Gabriel Barbecho, Adrian Popovici, Cornel Ilinca

The effects of the interaction between a gallery lining and surrounding ground are evaluated. The gallery is circular with constant thickness and surrounding ground as geotechnical characteristics is soft one. Two types of ground are successively considered with bulk modulus $K = 9,260$ kPa and $K = 4,630$ kPa. The analysis is carried out for a gallery with 3.80 m inner diameter and 25 cm thickness. This under construction is part of the irrigation system of the "Los Ríos" county (Ecuador). Comprehensive computations in various hypotheses pointed out the significant effects of the interaction. The sectional stresses (M , N) in the gallery lining embedded in soft ground depend mainly of the gallery depth versus ground surface. Contrary, the mechanical characteristics of the surrounding ground resulted to have little influence.

2016

Ghid de bune practici în vederea planificării și implementării investițiilor din sectorul microhidrocentrale

Authors: Marius Nistorescu, Alexandra Doba, Marcel Țibîrnac, András Attila Nagy, Diana Cosmoiu, Gavril Marius Berchi, Cornel Ilinca

Prezentul ghid de bune practici este elaborat de EPC Consultanță de mediu în cadrul contractului încheiat cu Asociația „Grupul Milvus” pentru „Elaborarea a 3 Ghiduri în vederea planificării și implementării proiectelor în sectoarele: Infrastructură de transport, Exploatare de microhidrocentrale și Parcuri eoliene”, parte integrantă a proiectului “Natura 2000 și Dezvoltare Rurală în România” implementat de către WWF Programul Dunăre Carpați România, alături de departamentul săi WWF Elveția, Asociația „Grupul Milvus”, Ecotur și Fundația ProPark. Redactarea ghidului a fost

coordonată de Marius Nistorescu, Alexandra Doba și Marcel Țîbîrnac. Experții care au contribuit la redactarea ghidului sunt: Nagy András Attila, Diana Cosmoiu, Cornellinca, Gavril Marius Berchi.

2015

The Influence of Soil Characteristics in Seismic Response of Embedded Structures

Authors: Adrian Popovici, Cornel Ilinca, Răzvan Vârvorea

The seismic response of a large wastewater collector box-type is performed by spectral analysis and direct time integration methods. The influence of mechanical characteristics of surrounding soil on structure seismic response is investigated. For this purpose the soil bulk modulus was successively considered 40,000 kPa and 80,000 kPa. The study points out the kinematic interaction soil-buried structure is usually more important than inertial interaction. Over wastewater collector is placed a river channel with 2.30 m deep water. The analysis shown the water from river channel led to significant increase in structure sectional stresses during seismic action.

2014

Influence of Dynamic Analysis Methods on Seismic Response of a Buttress Dam

Authors: Adrian Popovici, Cornel Ilinca, Razvan Varvorea

The seismic response of a large wastewater collector box-type is performed by spectral analysis and direct time integration methods. The influence of mechanical characteristics of surrounding soil on structure seismic response is investigated. For this purpose the soil bulk modulus was successively considered 40,000 kPa and 80,000 kPa. The study points out the kinematic interaction soil-buried structure is usually more important than inertial interaction. Over wastewater collector is placed a river channel with 2.30 m deep water. The analysis shown the water from river channel led to significant increase in structure sectional stresses during seismic action.

2011

DINAMICA STRUCTURILOR ȘI INGINERIE SEISMICĂ APLICAȚII VOL I. CONSPRESS, BUCUREȘTI 2011

Authors: Adrian Popovici, Cornel Ilinca

The book in Romanian "Dynamics of structures and Seismic Engineering. Applications" is addressed especially to students from the 3rd and 4th years of the Faculty of Hydrotechnics of the Technical University of Constructions Bucharest - the sections of Sanitary Engineering and Hydrotechnical Facilities - but it can be equally useful to students from other civil engineering faculties as well as design engineers in constructions.

Cartea "Dinamica structurilor și Inginerie Seismică. Aplicații." se adresează în special studenților din anii III și IV de la Facultatea de Hidrotehnică din Universitatea Tehnică de Construcții București – secțiile de Inginerie Sanitară și Amenajări Hidrotehnice – dar poate fi în egală măsură utilă studenților de la alte facultăți de inginerie civilă cât și inginerilor proiectanți în construcții.