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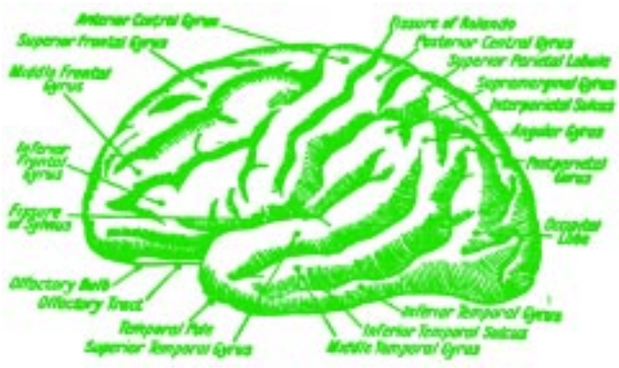
A MANUAL ON BRAIN DISSECTION FOR BIOPSYCHOLOGY



The manual introduces basic dissection knowledge on Neuroanatomy to Biopsychology students. It is divided into 12 sections, with a post-test for each section. The first section orients students to the Neuroanatomy laboratory and the proper behavior during laboratory session. Section 2 presents a layout of the human nervous system and the major divisions of the brain based on embryological development. Section 3 includes a description of the general structures in the nervous system and its covering. Sections 4 to 11 guide students in the dissection and identification of the parts of the brain using a step-by-step approach. Finally, section 12 includes a synthesis of the whole manual and the overall post-test.

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Let's Converse in FILIPINO
(Mag-usap Tayo sa FILIPINO)

This text is intended for use by foreigners who have knowledge of the English language, including grammar, and the desire to study the Filipino language extensively. At the same time, it serves as a refresher for those who have already experienced using the Filipino language but have not been able to do so continuously because they presently live in a country where Filipino is never spoken in casual and formal conversations.

The text aims to improve the conversational skill in Filipino of the learner or user. Specifically, it intends to: 1) provide the user with a better understanding of the Filipino language; 2) recapitulate the user's acquired knowledge of the language; and 3) familiarize the user with the existing culture of the language being studied.

The author has primarily utilized a communication-based framework. It allows the learner to analyze the differences between his or her own culture and that of the language being learned. These differences include such things as common greetings, families, traditions, cultural taboos, and norms. In this case, the learner must know not only the linguistic code of words and their meanings but also the cultural contexts in which the meanings are encoded and decoded.

The said framework is also expected to help in the development of thinking, speaking, and reading, as well as writing competencies of the learner in the target language. To make this possible, the following have been included in this text: sound-symbol relationships, vocabulary development, syntax, and culture-specific usage. In effect, this text has used a combination of teaching instructions that will enable learners to communicate meaningfully in another language.

The findings reveal that the English and Filipino sentence patterns differ in structure. Given this, the author strongly recommends that the user should not rigidly apply the rules of the English grammar to Filipino. Each grammatical lesson contains exercises that are helpful in the user's study of the Filipino language. As a supplement, the author includes typical and practical solutions and useful daily expressions. It is, therefore, suggested that the user must be patient and determined to finish the exercises, and do them correctly. More importantly, the user should promptly utilize the language being learned in conversations or discussions when the opportunity arises.

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REDESIGN OF INDUSTRIAL BEVERAGE CRATE WASHING MACHINE

The study investigates and optimizes the important parameters affecting the cleaning performance of beverage crate washing machines. These parameters include soaking temperature, soaking duration, liquid agitation, and use of detergent. Also included are spray washing parameters of pressure, duration, impingement angle, and nozzle diameter. The criterion used for evaluating the cleaning performance as affected by the various parameters is the degree of dirt removal. This is indirectly measured by comparing the luminance of the crate surface—before and after the washing treatment—from digital images of the test surface.

A test setup consisting of a soaking tank and spray section with crate conveyor has been designed and fabricated. Likewise, a digital imaging setup for taking photos of the test crates under consistent lighting conditions has been done. In order to have uniform starting levels of dirt on the test crates, artificial dirt consisting of fine charcoal dust mixed with an adhesive agent such as sugar syrup and water-based glue is applied. Digital photos of pre-marked areas before and after the washing treatment are taken and analyzed for average luminance. The net change of luminance is computed, and this corresponds to the level of dirt removed.

Results show that the soaking process itself has removed substantial amounts of dirt and that this dirt removal can be enhanced by high soaking bath temperature, increased duration of soaking, and turbulent agitation of the soaking bath. Maximum change in luminance level is achieved at soaking temperature of 70^0C, soak duration of 45 seconds, and high level of agitation.

Similarly, dirt removal during the spray washing process is improved by increasing spray pressure and duration. Changing the nozzle diameter and spray impingement angle shows minimal effect on cleaning performance. The best cleaning performance is achieved at the highest pressure setting tested, that of 3 bar, largest nozzle diameter of 6 mm, spray duration of 2.75 seconds, and impingement angle of 90^0.

The best overall cleaning performance is achieved by combining soaking and spraying treatments in which the crates have been presoaked at a minimum soaking treatment of 25 seconds duration at 30^0C soak bath temperature, and with no agitation, before the spray washing treatment. In this condition, the best cleaning result is obtained at the lowest pressure setting of 3 bar, largest nozzle diameter of 6 mm, longest spray duration of 5.3 seconds, and impingement angle of 90^0.

Based on the test results, the following design recommendations are made:

1. Crate washer design should include both soaking and spray washing sections to ensure optimum cleaning of surface-adhered dirt.
2. The soaking tank length should be sized such that crates are soaked for a minimum duration of 25 seconds at the rated speed of the washer.
3. Only minimal heating and agitation of the soaking bath are needed for good cleaning performance. However, for sanitation purposes, the soaking bath must be heated to at least 60^0C.
4. Spray pressure should at least be 1 bar while spray duration must be increased to at least 5.3 seconds by increasing the number of nozzles.

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Isolation of ANTIBACTERIAL SUBSTANCE from the Mucus of *Achatina fulica* Snails Found in the Philippines

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Recently, a glycoprotein isolated from the mucus secretion of African giant snails *Achatina fulica* Ferussac captured in Okinawa, Japan has been found to have activity against Gram-positive and Gram-negative bacteria. Based on this finding, the mucus secretions of three land snails belonging to Sub-Class Pulmonata, Order Stylommatophora—Achatina fulica, *Cochlostyla metaformis*, and *Cochlostyla metaformis ovularis*—are studied. The objective of the present study is to be able to isolate components with similar activity. The snails have been gathered from Silang, Cavite, kept alive in the laboratory, and fed with vegetables. Mucus secretion is enhanced by stimulating the collar of the snail with a spatula. Qualitative analyses show that the crude mucus samples are a mixture of glycoproteins with an isoelectric pH between 4 to 5. The water-soluble fraction has been extracted using Tris-HCI buffer (pH=8.0) and has been precipitated using 50% and 90% ammonium sulfate saturation. Each fraction is tested for activity against *S. aureas* and *E. coli*. Quantitative analyses on each fraction have been done using the Anthrone-sulfuric acid method, Biuret Reaction, and UV absorption of proteins at 280 nm. The electrophoretic patterns have been compared using sodium dodecylsulfate polycrylamide gel electrophoresis. Differences in the electrophoretic patterns may have accounted for the differences in antimicrobial activities. Gel filtration chromatography reveals two peaks important for activity; when these components are separated, activity is lost.

A BRAND IMAGE STUDY OF PHILIPPINE BRANDS IN SELECTED PRODUCT CATEGORIES

A brand is a name, term, sign, symbol, design, or a combination of these intended to identify the goods or services of one company or groups of sellers and to differentiate them from those of other competitors. In building strong brands, perception of quality differences among brands is essential for survival in the marketplace. The "share of mind" must be significant so that the brand can gain brand equity.

In an empirical study done by the proponent, the results show that some Philippine brands have gained brand equity through their rational and emotional attributes as perceived by their consumers. These brands are as follows:

Brand	Product Category
• San Miguel Pale Pilsen	- alcoholic drink/beer
• Jollibee	- fast-food restaurant
• Datu Puti	- food seasoning/vinegar
• Andok's Litson	- food stall/grilled chicken
• Tostillas	- snack food
• Hapee	- toothpaste
• Bench	- apparel

Here is a summary of the rational and emotional characteristics significantly attributed to these Philippine brands:

Brand	Rational Attributes	Emotional Attributes
San Miguel Pale Pilsen	Taste and availability	"Pambarkada" (for cliques and/or peer groups)
Jollibee	Affordable and cheaper	"Pampamilya" (family togetherness)
Datu Puti	"Maasim" (sour)	Satisfying and appealing
Andok's Litson	Well cooked and for all occasions	"Maka-Pinoy" (pro-Filipino)
Tostillas	Crunchy	Exciting and partygoer
Hapee	Fresher breath and gum protection	Clean and confident
Bench	Affordable	Image model's influence

With these results, the brand image is clearly perceived by the target consumers as a result of advertising campaigns done by the company, the "look" it projects as one sees the product in the marketplace or in the retail outlets, and product experience. Therefore, brand image is a major determinant in the "equity" of the brand, making the brand a recognized product in the category where it belongs.

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ON POLYNOMIAL CODES OVER $Z_4 \times Z_4$

This paper discusses some construction processes in generating polynomial codes over z_4 x z_4. The author uses the Hensel's Lemma and Hensel's Lift as tools adapted to the rings z_4 x z_4, z_2 x z_2, and z_2. By way of doing this, the "double lifting" process is introduced which allows one to construct basic irreducible polynomials over z_4 x z_4 from an irreducible polynomial defined over z_2. Cyclic codes over z_4 x z_4 are also discussed as particular examples of polynomial codes.

The main results of this paper are focused on the proofs of the following theorems:

1. Let C be a polynomial code of length n generated by the encoding polynomial $g(X)$ of degree r and let G be the codeword $(g_0, g_1, g_2, \ldots, g_r, 0, 0, \ldots, 0)$ (with $n - r - 1$ zeros following g_r). Then C is self-orthogonal with respect to á ñ, if and only if

$$\text{á}G_{(0)}, G_{(k)}\text{ñ} = 1, \text{ for } 0 \leq k \leq n - r - 1, \qquad (1)$$

or equivalently,

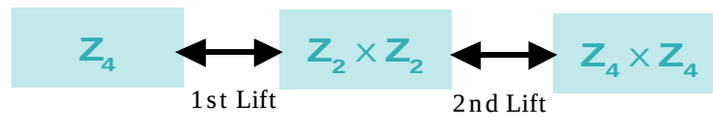
$$G_{(0)} \cdot G_{(k)} = 0 \pmod 4, \text{ for } 0 \leq k \leq n - r - 1. \qquad (2)$$

2. THE SECOND LIFTING THEOREM. Let n be an odd positive integer and $F_1(X)$ be a polynomial in $(z_2 \text{ x } z_2)[X]$ dividing the polynomial $X^n - 1$. Then there exists a unique monic polynomial $F(X)$ Î Â$[X]$ also dividing $X^n - 1$ such that $F_1(X) = F(X)$.

3. Let Ø ¹ C $(z_4 \text{ x } z_4)^n$ with n be an odd positive integer. Define the map j from $(z_4 \text{ x } z_4)^n$ into $(z_4 \text{ x } z_4)[X]$ / á $X^n - 1$ñ by

$$(c_0, c_1, \ldots, c_{n-1}) \quad c_0 + c_1 X + \cdots + c_{n-1}X^{n-1} + (X^n - 1). \qquad (3)$$

Then C is a cyclic code if and only if its image under j is an ideal of $(z_4 \text{ x } z_4)[X]$ / á $X^n - 1$ñ.



The construction of a cyclic code over z_4 x z_4 is made possible because of the "double-lifting" process introduced in this paper. The idea is to construct a polynomial code starting with a polynomial over z_2 that divides the polynomial $X^n - 1$, where n is an odd positive integer. The first lifting process generates a polynomial over z_2 x z_2 which also divides $X^n - 1$ in $(z_2 \text{ x } z_2)[X]$ which will then be lifted to the second level—a polynomial over z_4 x z_4 which will become the generator of the cyclic code.

Apart from the discussion on the construction of cyclic codes, some theorems involving self-duality of polynomial codes over z_4 x z_4 are also included in this paper. In particular, the following theorems were proven:

4. Let C be a polynomial code of length n generated by the encoding polynomial $g(X)$ of degree r and let G be the codeword $(g_0, g_1, g_2, \ldots, g_r, 0, 0, \ldots, 0)$ (with $n - r - 1$ zeros following g_r). The C is self-orthogonal with respect to á , ñ if and only if

$$\text{á}G_{(0)}, G_{(k)}\text{ñ} = 1, \text{ for } 0 \leq k \leq n - r - 1, \qquad (4)$$

or equivalently,

$$G_{(0)} \cdot G_{(k)} = 0 \pmod 4, \text{ for } 0 \leq k \leq n - r - 1. \qquad (5)$$

5. Let C be a polynomial code of length n generated by the encoding polynomial $g(X)$. Then C is self-dual if and only if the dimension of C is $\frac{1}{2}n$ and $g(X)$ satisfies condition (4) or (5).

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Coding theory and combinatorics

FACTORS INFLUENCING THE CAREER CHOICE OF COLLEGE FRESHMEN IN SCIENCE AND ENGINEERING:

A Study of Private and Public Universities

This study aims to describe the different factors that may influence the students' career choice in higher education eventually leading them to choose a course in science or engineering. A total of 540 students were chosen from three private universities and three public universities in the National Capital Region: 174 respondents came from the private universities (De La Salle University, University of Santo Tomas, and University of the East) and 366 respondents came from public universities (Philippine Normal University, University of the Philippines-Manila, and Pamantasan ng Lungsod ng Maynila). Of these respondents, 284 are males and 256 are females. A general survey method was used to gather data.

The survey questionnaire is a modification of the instrument, Factors Affecting Schools' Success in Producing Engineers and Scientists (FASSIPES) developed by Brian Woolnough of the Department of Educational Studies of Oxford University. Descriptive and inferential statistics were used to analyze the data. Multiple regression analysis was done on the different factors that influence career choice of student respondents in private or public universities in which six prediction equations were obtained.

The study reveals the following:

1. The different factors influencing student career choice in science or engineering in selected private or public universities are in-school factors, out-of-school factors, and personality traits.
2. There is a significant association between career choice in science or engineering and each of the following factors: a) gender, b) high school curriculum, c) school where the respondents graduated from, d) scholarship grant, e) parents' educational attainment, f) parents' college degree, g) period when career choice was made, and h) close relatives who are involved, one way or the other, in the fields of science and mathematics;
3. Adventurous, caring for people/things, conscientious, hardworking, clever, enthusiastic, gregarious, and self-sufficient or independent-minded are the dominant personality traits common to all the respondents.
4. Creativity is a personality trait for male respondents who have chosen a career in engineering but not for female respondents.
5. Majority of the respondents have chosen a career in science or engineering because of social status of the job, job availability, and financial security.
6. Male and female respondents have significantly different perceptions on sex-stereotyping of science or engineering as a career.
7. Engineering is viewed as a career for men only and physics is viewed as a career mostly for men.
8. For male respondents, the predictors that have positive effects on career choice are involvement in science clubs, quality of science teaching in high school, salaries offered in mathematics, and science & technology professions.
9. For female respondents, the predictors that have positive effects on career choice are quality of science teaching in high school, exam results in high school math, father's occupation, career of siblings, social status in science and math, and career advice from high school guidance counselor.

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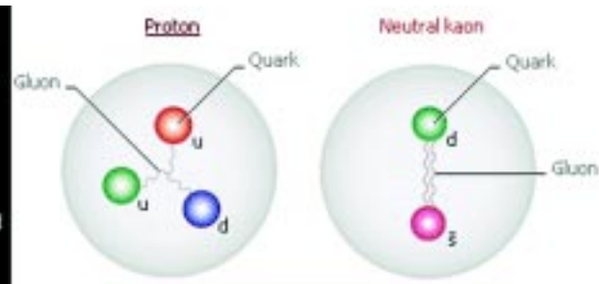
Calculation of One-loop Effective Multigluon Interaction Lagrangians with Derivative Corrections in Arbitrary Dimensions

Gluons are particles of energy that carry the strong nuclear force. They hold together particles called quarks and antiquarks, which combine to form hadrons. Examples of hadrons include protons and neutral kaons. As gluons bind together quarks, or quarks and antiquarks, they affect a property of quarks and antiquarks called color charge.



This research focuses on the possible interactions between gluons mediated by virtual particles.

The one-loop effective Lagrangians for Yang-Mills fields interacting with matter are calculated accommodating this time the higher covariant derivative corrections through the background gauge connection. In particular, the one-loop effective multigluon interaction Lagrangians mediated by vectors and ghosts, scalar bosons, and Dirac fermions are evaluated separately in arbitrary space-time dimensions and in arbitrary gauge group. The one-loop interaction Lagrangians are evaluated explicitly for N = 2,3,4 powers of the background gluon field and alternatively for D = 4,6,8 mass dimensions, based on the two plausible definitions of the N-gluon process, namely: power-based and (mass) dimension-based. It is found that derivative corrections appear for N = 2 and for D = 6. In the appropriate limits, these results agree with those found in the references cited.

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