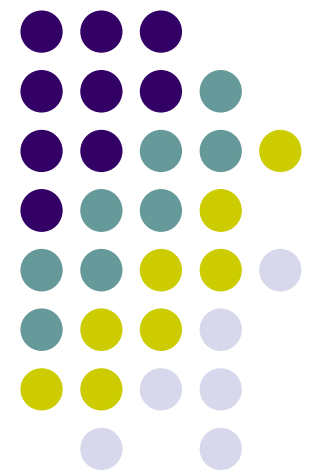
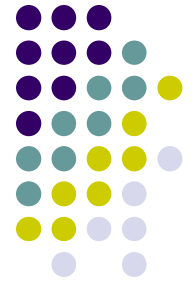


SOME UPSTREAM RESEARCH PROGRAMS FOR MUSLIM MATHEMATICIANS:

Operationalizing
Islamic values
in the Sciences
through
Mathematical Creativity



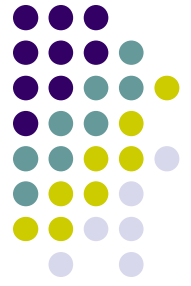
by Dr. Adi Setia (adisetiawangsa@gmail.com),
03/12/08, INSPERM/UPM/MALAYSIA



1. Values & Axioms

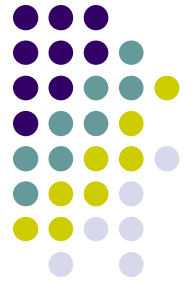
- Mathematics, like all other sciences, exact or inexact, pure or impure, is *value-laden*.
- Values were there first before the axioms, and the latter embodies the former.
- Hence mathematics is *formalization of values* by which they are *clarified, objectivised* and *operationalized*, for cognitive or pragmatic purposes, or both.

1. Values & Axioms (cont.)



- This understanding of the *value-laden-ness* of mathematics is explored here by suggesting some *upstream research programs* for *Muslim* mathematicians as a guide toward *operationalizing* Islamic values in the sciences through the power of mathematical rigor and objectivity.

2. Upstream/Downstream Research Programs



- *Upstream research* is motivated by a high sense of *critical self-awareness* on the part of the researcher of his *personal identity* and *purpose in life*, in line with his understanding of, and *commitment* to, the *worldview* and *value-system* he is embracing or declare himself to be embracing, including understanding of the *real problems* he has *identified* to be tackled as a result of that critical self-awareness.

2. Upstream/Downstream Research Programs (cont.)



- *Downstream research* is “*retail research*” that is restricted to the narrow, largely uninteresting objectives of merely developing *technical refinements* to existing mathematical theories, theorems and sub-fields that have already “matured,” or, worse still, to develop new but *trivial applications* therefrom or testing the effectiveness of, and reception to, the various, readily available techniques, methods, softwares and models. (*mopping-up operations!*)

2. Upstream/Downstream Research Programs (cont.)



- The *intellectual nadir* is reached when mathematical theories, theorems, fields, models, techniques, softwares and applications originally developed in the *context of western secular cultures* for tackling their problems as they conceived them in line with their worldviews and value systems, are simply *adopted without examination* for use in the contexts of cultures adhering to totally different value systems, beliefs and worldviews, and belonging to totally different sociohistorical backgrounds.

2. Upstream/Downstream Research Programs (cont.)



- *However*, if the downstream research itself flows out from the results of an upstream research (i) that one has *identified and chosen* for oneself, *or* (ii) that one has *self-consciously accepted* and adhered to, then it is *in spirit* an upstream research, and only downstream *in form*.
- Hence, such downstream research is creative and *non-trivial* since it flows out of *critical self-consciousness* of one's values.

3. Cases in point I



BIOMATHEMATICS

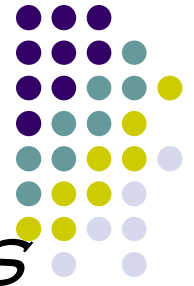
(= mathematical representation/modelling/description
of biological processes)

- Evolutionary Biomathematics
(life came about by chance)

versus

- Creationary Biomathematics
(life came about by divine intelligent design)

3. Cases in point II



FINANCIAL ECONOMICS/MATHEMATICS

(= applying mathematical tools to the allocation and deployment of economic and/or financial resources, both spatially and across time, to fulfill needs in varying contexts).

- Fiat Money System/Debt-Financing

versus

- Gold *Dinar*/Silver *Dirham* System/
Equity Financing

3. Cases in point III



ECONOMETRICS

(= applying quantitative or statistical methods to the study and elucidation of economic principles).

- Neoliberal Privatization

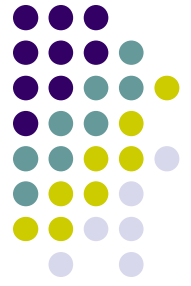
(private interests override public interests)

versus

- Islamic *Waqf* System

(public interests override private interests)

3. Cases in point IV



ACCOUNTANCY MATHEMATICS

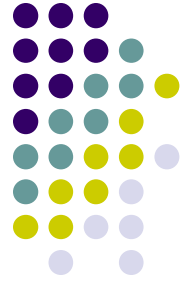
(= APPLYING MATHEMATICAL TECHNIQUES TO FINANCIAL AND RESOURCE ACCOUNTING FOR REALISING ACCURATE INFORMATION FOR DECISION MAKERS).

- Spillover Costs *Externalized* = externalities
(self-interested approach)

versus

- Spillover Costs *Internalized* = internalities
(public-interested approach)

3. Cases in point V



ACTUARIAL SCIENCE

*(= applying mathematical and statistical methods
to risk assessment in the finance and insurance business)*

- **Selling Risk**

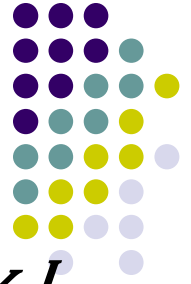
(conventional insurance & banking)

versus

- **Mutuality**

(Islamic takaful, equity-financing & venture capital)

3. Cases in point VI



THEORETICAL PHYSICS AND COSMOLOGY I

- *Instrumentalist Interpretation* of Relativity
and Quantum mechanics

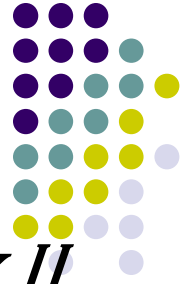
*(instrumentalism/ontological agnosticism =
non-committal to nature of ultimate reality)*

versus

- *Ontological Interpretation* of Relativity
and Quantum mechanics

(ontological realism = commitment to nature of ultimate reality)

3. Cases in point VII



THEORETICAL PHYSICS AND COSMOLOGY II

- Hylomorphism/Continuity of Nature
(tends to ascribe ontological autonomy to nature)

versus

- Atomism/Discontinuity of Nature
*(uncompromisingly affirms the
ontological dependence of nature
on the Creator)*

3. Cases in point VIII



HISTORY OF MATHEMATICS

- Eurocentric Mathematics

(Greeks invented mathematics for the first time in history)

versus

- Humanocentric and Ethnomathematics

(human beings invented mathematics before and after the Greeks)

4. Special Case in Point



- An INSPEM research project on the Malay-Islamic ethnomathematical tract of

Shaykh Ahmad al-Khatib al-Minangkabawi,

(circa 1850—1900 CE)

entitled:

- *‘Alam al-Hussab fi ‘Ilm al-Hisab*

(= The Banner of the Mathematicians Concerning the Science of Mathematics).

To prove, inter alia, that Malay-Islamic Mathematical Creativity did not begin with the British colonials!

5. Conclusion I



- “The future math, like the past, cannot be value free. It has always been a radically *human activity*. It serves *human purposes*. It may be rigorous, but its objectivity is subject to *human values*, including the evolving *ideology* of ‘objectivity’. It is also one of the most vibrant areas for human creativity, as *new fields* emerge in areas such as vector analysis, topology, calculus, set theory, and many other fields.”

(Reverend Richard Kirby)

5. Conclusion II



- “...mathematical science is not as objective as it is commonly believed...not purely quantitative and logical...mathematical truth is shown here as *many-valued* and *relative* to a particular agreed paradigm. Its acceptance is not purely based on rationalism, logic and consistency, but also based on pragmatism, aestheticism, rigour, sophistication, belief and personality of scholars.”

(Professor Dr. Shaharir Zain).

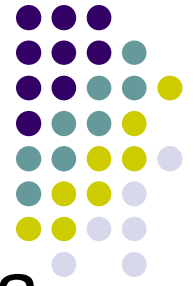
5. Conclusion III



- “The Platonic conception of mathematics as value-free is in itself a value-laden conception which only serves to hide from most people the intimate links between mathematics as such and the *belief systems* of its practitioners.”

(Dr. Brian Martin, *paraphrased*)

5. Conclusion IV



- Hence, ***Islamization of mathematics*** is a “*symbiosis*” between mathematics and the *Islamic value-system*.
- Namely, a mathematics whose objective, quantitative results embody the *cognitive and ethical values* of Muslim mathematicians who *care deeply about understanding and living the Islamic vision of truth and reality* in both their personal and professional lives.

6. And Finally....



- A very BIG THANK YOU, for your attention and interest.
 - Feedback is most welcome.
 - The franker, the better!

BEST REGARDS

NOTE: FULL ARTICLE-LENGTH PAPER ON THIS TOPIC IN BOTH ENGLISH AND MALAY VERSIONS, WITH COPIOUS FOOT- AND END-NOTES AND DETAILED REFERENCES AVAILABLE ON REQUEST FOR FREE FROM MY THUMB-DRIVE.