plication of probabilities corresponds to taking the infimum (or minimum) of membership functions.

The theory of fuzzy sets is still in a state of theoretical development. Because of the many real-life situations to which fuzzy set theory seems to be relevant, there has been worldwide interest in it and also some criticism of it.

Conclusions

The discussion of fuzzy sets indicates that set theory should be extended to make it more suitable for the development of algebraic structures with wider applications. Stochastic optimization, a synthesis of the three areas of continuum mathematics, is a rapidly growing field particularly in the context of control theory. Applications of discrete mathematics have found a rich outlet in graph theory, particularly in the social sciences. However, there remains a wide gap between the sophisticated activities that are required for the development of optimum policies and the more difficult and intractable problems of organizational structures and performance.

The state of mathematics at present does not permit the development of general models by which the physical and economic aspects of a problem can be related to their social implications. So far, the total systems approach requires that the problem be partitioned with each partition being modeled separately; imagination and logic must then be used to combine the solutions so that they apply to the original problem. The social sciences are making rapid progress along various lines of quantification but significant mathematical theories that can be applied in this field have yet to be found.

Because of its undefined boundaries, operations research provides unlimited opportunities for pioneering work in mathematics. Operations research extends the roots of mathematics into the real world.

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NEWS AND COMMENT

AMA: Specialty Journals Must Lure Paying Subscribers

The American Medical Association (AMA) is trying to save money. A drop in dues-paying members (dues are $110 a year) and rising costs have forced the AMA, which everyone presumed to have unlimited wealth, to take stock of its resources. In the last 2 years, the organization has gone in the red to the tune of more than $3.8 million. This sizable deficit for a presumably flush outfit has lead many observers to the conclusion that the AMA is going broke. That isn't really true. But the AMA has set about trimming what it sees as the fat out of its operation in an attempt to make the future fiscally black.

Apparently the AMA realized as many as 4 years ago that a bit of fiscal restraint might be in order, inasmuch as its House of Delegates adopted a resolution calling for cost-cutting in June 1968. The first clear evidence that that resolution was taking effect came late last month, when the AMA met in Cincinnati.

The house, which is the governing body of the association, approved two actions proposed by the board of trustees to pare expenses. The first will put an end to the long-standing practice of allowing AMA members a free subscription to one specialty journal, in addition to the *Journal of the American Medical Association* (JAMA), and raises questions about the future of those journals. The second calls for the elimination of some of the AMA's councils and standing committees, whose cost apparently was not deemed justified by their productivity. Together, these actions will save an estimated $840,000.

Ever since 1909, when it began publishing the *Archives of Internal Medicine*, the AMA has been in the business of publishing specialty journals. Today it puts out ten (Table 1), with a combined circulation of about 180,000. Designed from the beginning to be academic journals, they have been untouched by the political turmoils that beset the organization, and they seem proud of that independence. Qualitatively, they vary but generally seem to be considered acceptable. As one specialty journal editor phrased it, "Actually, they are all very good journals, though each is not necessarily the top journal in its field." Three of them make money: *American Journal*

of Diseases of Children, Archives of Dermatology, and *Archives of Internal Medicine*. The other seven operate at a loss, costing the AMA about $575,000 a year. According to Hugh Hussey, editor of JAMA and chief of the association's journal-publishing endeavors, they are published "as a service to the profession." (JAMA, a weekly that goes to each of the AMA's members, brings in several million dollars in advertising revenues each year.)

Because of the end of free subscriptions, the fate of these ten specialty journals seems to be very much up in the air. None of the specialty editors reached by *Science* before this issue went to press had any clear notion of what the future holds. Nor did they know much about the business side of magazine publishing. "That is something I've just never had to worry about," one of them said, adding that no one expected his journal to go out of existence right away, in any case. Each of the specialty journals has non-AMA subscribers who pay relatively low rates. One of them, for example, is only $12 per year. In several cases, AMA members constitute 50 percent or more of the journal's readership.

Table 1. AMA specialty journals and approximate circulations.

Journal	Circulation
American Journal of Diseases of Children	20,000
Archives of Dermatology	12,000
Archives of Environmental Health	9,000
Archives of General Psychiatry	18,000
Archives of Internal Medicine	53,000
Archives of Neurology	11,000
Archives of Ophthalmology	14,000
Archives of Otolaryngology	10,000
Archives of Pathology	10,000
Archives of Surgery	42,000

According to AMA officials, there will be a major drive to convert members who have been getting the journals free to subscribing readers, but no one really knows whether that will work. If about half of them are willing to support the pay-as-you-go plan, the AMA will break even.

The elimination of complimentary subscriptions to specialty journals naturally brings up the question of the AMA's commitment to its scientific mission and to the academic side of medicine. Some members see this move as a "denigration of medicine," in spite of official assurances to the contrary. There has been little reaction to the journal-cutting move so far, probably because most members have yet to be informed that it happened. Those who deplore this route to economy find it particularly hard to take in light of the fact that the AMA is about to publish a new magazine called *Prism*, a monthly that will be sent free to all dues-paying members.

NAS Members Appeal on Behalf of Soviet Colleagues

In a highly unusual, politically tinged gesture, members of the National Academy of Sciences (NAS) have sent two letters to the president of the Academy of Sciences of the U.S.S.R. urging that Soviet scientists be allowed to pursue their work, to travel to scientific meetings, and to emigrate without hindrance from their government.

One letter, addressed to Soviet academy president M. V. Keldysh, was sent on 24 October, soon after a meeting with Keldysh in Washington at which NAS president Philip Handler made a forceful presentation in behalf of the right of Soviet scientists to emigrate. The letter, composed by Rochester University chemist Jacob Bigeleisen, was circulated to the 950 members of the NAS. It was signed by 413 of them, and endorsements continue to come in, says Bigeleisen.

The other letter, sent on 31 October and signed by 42 NAS mathematicians, was designed to appeal to the professional instincts of Keldysh, who is himself a mathematician. Oscar Zariski, a Harvard University mathematician, initiated this effort on the urgings of colleagues in Israel.

Since the letters were not official NAS pronouncements, neither bore the signature of Handler, vice president George B. Kistiakowsky, or foreign secretary Harrison Brown.

Bigeleisen noted that the letters were "rather extraordinary" gestures for a group of NAS members to make. They are not unprecedented, however—members have also gotten together to express their views on the Vietnam war.

The letters reflect growing concern among U.S. scientists about the way the Soviet Union is treating those of its scientists, most of them Jewish, who are trying to leave the country. The Bigeleisen letter was inspired particularly by the case of Soviet physicist V. G. Levich (*Science*, 23 June).

There has been some question as to whether noise from other countries would help or hurt the cause of beleaguered Russian intellectuals. Outsiders are convinced now that the Soviet government has become more sensitive to world opinion. To exploit this, Harrison Brown has been discussing with leaders of European scientific academies the possibility of launching an international appeal asking that Soviet scientists be allowed to travel and emigrate freely.

The following is the text of the letter to Keldysh signed by 413 academy members:

> In your address to our Academy on 17 October 1972 you stressed the importance which you, the Soviet Academy, and the U.S.S.R. attach to international cooperation in science. The agreements reached in Washington will increase the exchange of scientific information and personnel between our countries.
>
> Our goals are the free exchange of scientific information and personnel in all areas of science. To achieve these goals, scientists must be free to:
>
> 1) pursue scientific investigations,
> 2) publish the results of their investigations,
> 3) travel to scientific congresses,
> 4) emigrate from their country of residence when the above rights are encumbered.
>
> We, the undersigned individuals, members of the United States National Academy of Sciences, uphold these rights of all scientists. We are deeply concerned that a number of Soviet scientists are currently being denied these rights and their freedom as scientists. We call upon you to transmit our concern to your government and to the members of your Academy. We call upon the members of the Soviet Academy of Sciences to support the four freedoms of science.—C.H.

Prism will be about the sociology and economics of medicine.

The first issue of *Prism* will be out in April, and it promises to be an impressive looking magazine. Its editor, Charles Renshaw, reports from AMA headquarters in Chicago that *Prism* will be distinguished by an unusual 11 by 11 inch format "to help us stand out from the crowd." It will also boast "opulent four-color graphics," which, together with its square, art folio format, is expected to attract advertisers. In addition to dues-paying members, a select group of nonmember prescribing physicians and some interns and residents will receive *Prism* free, for a total circulation of 210,000. The magazine will cost the AMA a bit more than $1.2 million during its first year, in which ad revenues are estimated to be $800,000. But by 1974, the hope is that *Prism* will at least be breaking even, if not turning a profit.

The first issue will tackle a number of general "socioeconomic" topics, such as China's "barefoot doctors" and the problems of educating a physician to be "socially oriented." On the more practical economic side, there will be a piece on where to start a practice and one on what physicians should know before they sign a lease. According to Renshaw, articles on the arts, leisure-time pursuits, and travel should also have great appeal to AMA members. The stated philosophy behind *Prism*, however, is to create a magazine that speaks to the "urgent" social issues of the day and that has plenty of room for opinions at variance with official AMA policy. "This will not be a house organ or a mouthpiece for the association," he said firmly.

Assessing the recent action, one of the specialty journal editors said he would find the present situation palatable if the AMA were in desperate need of money. "But when they cut back on us and then turn around and put out a slick magazine about money, well. . . ." When the matter of *Prism* came up on the floor of the house, one of the delegates expressed a somewhat similar view. The house was being asked to OK a report that said in part, "It is anticipated that *Prism* may be substituted for a specialty journal as an AMA membership benefit." Robert E. Zellner of Orlando, clad in a bright orange blazer that sets the Florida delegates apart from the rest of the crowd, stood up to complain, particularly about the use of the word "substitute." Zellner pointed out that the specialty journal subscription "is one of the few things we get out of AMA membership that actually enables us to take better care of our patients." He said he thought the substitution would not do much to enhance the AMA's public image, but his objection did not get very far.

Obviously, the AMA's cost-cutting ventures, somewhat undercut by the expense of launching a new magazine, are modest, particularly in light of the organization's total budget of about $34 million. Nevertheless, by paring down ("streamlining," they call it) and by investing in what is likely to become a new paying operation (*Prism*), the AMA is recognizing that its fiscal capacity is not unlimited. As one of the editors put it, "Now the AMA is more like everybody else."

—BARBARA J. CULLITON

New York University: Learning to Live with Red Ink

Annual income twenty pounds, annual expenditure nineteen nineteen six, result happiness.

Annual income twenty pounds, annual expenditure twenty pounds ought and six, result misery.—Mr. Micawber, in *David Copperfield*

If Mr. Micawber's formula for happiness is any guide, many of the universities in the country, increasingly faced with deficits, must be in misery. And if budget makers nationally are groaning, those at New York University (NYU), which is the country's second largest private university and which by June will face a $14 million deficit —or half its unrestricted endowment— must be positively wretched.

NYU is a huge (40,000 students), urban (based in Greenwich Village), and sprawling (a second campus is 14 miles north, in the Bronx) institution that has played a key role in educating many of New York's small businessmen and professionals for most of its 141-year history. Moreover, throughout the 1960's, NYU's urbane, nationally known president, James M. Hester, led the university on a course of physical and academic expansion and a quest for academic "excellence," the Holy Grail for many universities during that period. Hester was successful in raising the quality of students coming to NYU, in getting about a dozen new buildings built or started, and aiding in spectacular fund-raising campaigns. As his equally glamorous chancellor, educational economist Allan M. Cartter noted, in reminiscing about NYU's golden age as the urban university of the 1960's: "We were practically beating the students away with sticks."

Today, however, NYU has collided with a heap of financial problems producing a budgetary disaster of titanic proportions. The momentum of rising enrollments, rising federal support, and the attractiveness of an urban educational setting has been dramatically reversed since 1968. Hester and Cartter have been sending out SOS signals to Albany and Washington with mixed results. And, last July, Cartter resigned, saying that he felt that "anything I could do I had done" for NYU. Meanwhile, a task force of deans has reported that NYU must engage in a vast and bloody rescue operation to balance the budget by 1974–75 if it wants to avoid being "the victim of one of the largest and most spectacular collapses in the history of American higher education." How NYU got to this point, and what it plans to do about it will be the subject of this article, for, as many observers and NYU administrators especially insist, what is happening to NYU is happening, to some extent, everywhere.

Two basic factors have been responsible for NYU's fortunes swinging so