

Ec. 162 Used Notes
F88

Why you are having trouble.

1. Text says it all in a diff. way. - this topic only.

My only ref. to text is critical.

2. Purpose of analysis is to expose fallacies you may already believe.

Many people don't think they're learning unless what they learn supports what they already believe.

You've been lied to all your lives, & will be for the rest of yr. lives. Purpose is to control & exploit you. Purpose of this course is give you some tools w. which you can think for yourselves.

That frightens some; but is what college is all about.

Office hrs. 11-12; 2-3

Text: assmt.

Calculator

Fri. quizzes, 15 min. 1st one self-graded.

Problems

Grades:

- Quizzes, 40%

Partia, 15%. Includes answering ques.

Mid 15%

Final 30%

Abbrevs used in grading

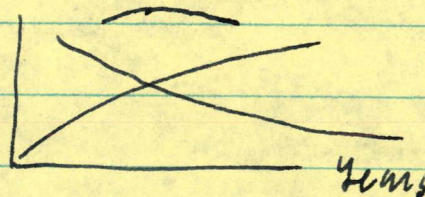
Course in techniques.

Goal-oriented - decision rules.

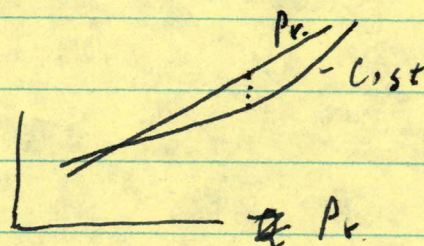
Optimization

Like maximizing, only more complex.

Adding:

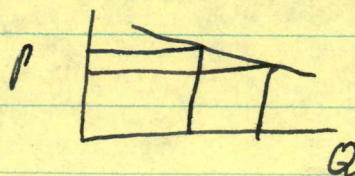


Subtracting:

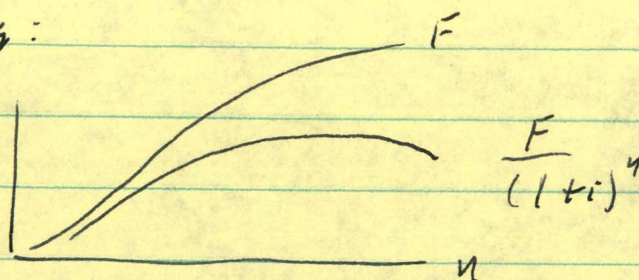


Finding net products: Architects; edn; land. Net = lean

Multiplying:



Dividing:



Optimizing is max'g an "objective fn."

$$\frac{F'}{F} = \frac{i(1+i)^n}{(1+i)^n} = i$$

Course in fallacies, errors, blunders

Partly as good fun. Sub appeal. Reward for effort.

But is more useful. Saves effort of re-analyzing, each time a new error comes along & they do. "Truth struck to earth will rise again..." So do lies, errors, fallacies.

Course in language

Learn new terms. Expand vocabulary. Will distrib. list to learn. Give some e.g.

a word is a "filename"

Course in reality

History, insts., real live examples

Beware of pure formal axiomatic reasoning,
w/o ref. to world around us. We also look at
what keeps people from optimizing.

Wed . 28 Sept.

Re Intro

pp. 4-7 fluffy.

"Firm" includ: prop.; ptnsp; coop; corp; estate; family;
church; city; univ.; state; fed. agency;
district;

~~Inside~~ Inside firm, mkt. does not rule directly.

Why? pp. 7-9, exs. of scale, 1st pass.

Firm is not only unit. Is unstable, & increasingly
so. J. Manville; Kaiser Steel; SP; KCLC.

Is also "in personam". "Profit" affected by debt, e.g.
~~So much~~

So often use fixed assets as basic unit, as
classical exs. did. Focus on ops rather than empire-
bldg; Meyer & Acqua.

Objective: max PV

E.g. defer use of oil

Rule of 72

1
~~Re~~ "Basic Trng". Cont. Mon. 1 Oct 88

Re MP

1. Rewarding functional effort.
Identify, measure, & gear punts to it.
Hire & fire
Buy & sell
Leave & abandon

"Functional" differs from "personal"

"The boss" earns "profits". Personal.

Profits come from land (cc. rent); capl. (man-made, depreciable); mgmt (generically, labor). Don't tell you which source. Reduced by debt, & wgs. - salaries

Raiders know. If mgmt. is negative, they go for the land + K.

All prodn. requires some land, labor, K.

2. Dim. rets.

a. Intuitively easier to take land as fixed. Traditional.

b. Symmetry.

Stop at any pt. in the model, let the fixed ~~the~~ parameter become the variable.

E.g. On B.S. on Fri, quiz. $MP_w = 0$,
 $AP_L = \max$, $\therefore = MP$.

It follows, when $AP_w = \max$, $MP_L = 0$.

" " " $MP_w = \max$, $MP_L < 0$

Max. AP of one by waiting the other. Beware!

c.d. Skip

c. Universal nature dim. rets. Thy transcends
techn. "Kissii don't last; cookin' do"

6. E

~~f~~
$$\frac{a'/a}{w'/w} = \frac{a'/w'}{a/w} = \frac{MP}{AP}$$

7. 3 Stages of prod.

Fri., 30 June 88

C = Column

S = Stratum

~~V~~ = vertical

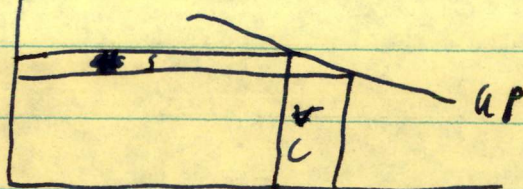
~~H~~ = horizontal

$$TP = x \cdot y$$

$$MP = \cancel{H} - \cancel{H} C - S$$

Graphically

1. Start from AP.



$$C = \cancel{\Delta x} y \cdot \Delta x \quad (\Delta x = 1)$$

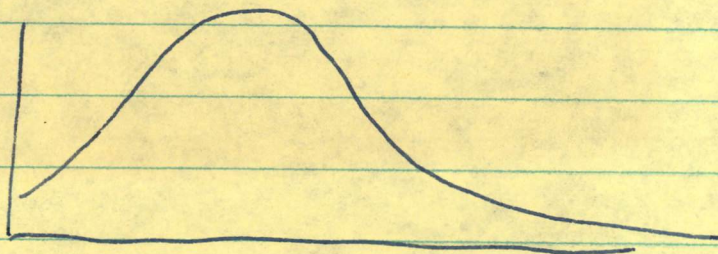
$$S = x \cdot \Delta y$$

Ignore small triangle, for small changes.

To understand analysis, see it:

1. Numerically
2. Graphically (pictorially)
3. Algebraically

2. Start from MP



TP = area

AP has critical relations to MP

Same when $x=1$: "begin together"

AP rises down: is mean of the MPs

AP max when = MP

3. Start from TP

12 June 88 VIII - 13

IDEA Whose Time Has Come

By EVELYN De WOLFE, Times Staff Writer

Prodn Evt.

With a site plan neatly centered on his computer screen, William Turner, a vice president of 3D/International of Houston, summoned a sample 12-story structure and effortlessly positioned it on the site.

He then called for design changes in a simulated pre-planning meeting of a project team.

The demonstration focused on an innovative computer software program, known by the acronym IDEA (Integrated Design and Economic Analysis)—a new tool, being introduced to the California real estate industry through Baker-3D/International, Los Angeles, and developed by the parent company.

Reportedly the only available system in its present application, IDEA allows architects and developers to experiment visually with a "what if" graphic format, discarding or incorporating a vast range of

design choices and to immediately see how the total building economics are affected.

Assuming the role of developer with a predetermined budget, the visitor experimented with design options and, when additional floors were requested, algorithms built into the spreadsheets instantly projected new construction costs to reflect the additional structural expenditure for heavier columns.

Additional Interest Costs

Within seconds, the program had foretold what end-result costs would be involved for the proposed design option, including the additional interest for interim financing for the longer construction period.

"The program provides a foundation for design, facilitates teamwork, speeds feedback, documents analyses and decisions and, hope-

fully, helps pare down overall costs for developers," said Danford M. Baker, president of Baker-3D/International.

"Each new suggestion resulting from team input is examined, calculated, dissected and, in a flash, integrated into the total project cost for further dickering and evaluation. With each change, the team is apprised on how it has affected the total building economics," Baker said.

The basic IDEA components include: a building description using computer-aided design (CAD) drawings or words and numbers; cost estimate, based on historical building type data, cost of materials and an economic analysis that may include soft and hard costs, operating and financing costs, replace-

Please see IDEA, Page 17

wards that could exceed the value of the loan itself.

Meanwhile, some tenants who are shopping for new office space are using the presence of asbestos as leverage to get a potential landlord to make concessions.

In buildings where loose asbestos must be removed or contained, Knott says he has usually been able to get the landlord to pay all the costs. "But that could change if the market tightens and space becomes harder to get," he added.

Seek Reduced Rent

If a landlord won't agree to removal or repair, says Knott, "some tenants will say, 'fine, we're going somewhere else.'"

Others will still take space in a building with asbestos, but at a reduced rent. Knott says buildings with asbestos are renting for about 5% less than comparable buildings without it, even if the asbestos doesn't currently pose a health risk.

Since removal can cost up to \$35 a square foot—not much different than rents at many top-notch buildings and even more than rents at others—several building owners have been loath to take out asbestos that doesn't currently pose a health hazard.

Likewise, many don't want to

ing consultants to determine whether they must notify tenants or visitors to their building about the possible dangers, Masters said.

Toxics on Premises

Some attorneys say greedy landlords could use another provision in Proposition 65 to evict tenants who signed long-term leases several years ago, and are now paying below-market rents.

The provision allows landlords to cancel the lease of any tenant who doesn't notify the landlord of certain toxics that are on the tenant's premises.

"It's conceivable that a landlord might use this as leverage to raise a tenant's rent or break the lease altogether," Fafenrodt said. Adding to his concern: New chemicals may be put on the disclosure list that the tenant won't find out about until it's too late.



The Los Angeles City Council's expected decision to require commercial landlords to install fire-sprinkler systems in the wake of last month's fire at the First Interstate Bank Building raises an interesting question: Who must pay for it, the landlord or the tenant?

Most commercial leases contain a provision that makes the tenant

FAIR OAKS BU

PASADENA,

- State of the Art Buildings
Designed to Accommodate a Wide Variety of Tenant's Needs
- Space Available Ranges from 825 to 23,000 Square Feet
- 224 Car Parking Provides Ample Spaces for the Needs of Tenants and Customers



(8

ANOTHER

WATT COMM

CENTURY OFFICE

Suites from 825 to 1

For the first time in more than
for lease at The Eighteen E
prestigious location offers a
address surrounded by all th

The Eighteen Eight

1888 Century Park East,

IDEA: Special Software to Go Over Hard Numbers

Continued from Page 13

ment costs and multi-year cash flows.

Baker said in using IDEA, assumptions are made about construction costs, rent rates or market conditions. "These factors are, of course, influenced by future events. We can never accurately predict changes in the future, but what the computer model gives us is useful feedback information for judgment decisions and allows us to evaluate a variety of options, given the same set of facts."

Turner started to work on the system last fall as a company-funded research project, and came up with the concept name—Integrated Design and Economic Analysis. He also wrote the programs capable of transferring CAD drawings, measuring everything three-dimensionally, and linked directly to performance spreadsheets.

The original concept was first implemented as a *pro bono* project for the federal government in Washington, for the Judiciary Office Building of the U.S. Courts. Presented to the architects of the capitol and secretary of transportation in December of 1986, IDEA aided the firm in its assignment to develop a major new federal ad-

ministrative building.

"In a broader sense, one would best describe the concept as an economics tool and framework for team collaboration that allows us the flexibility to study the many options available within a given project before putting pen to the paper. That is the best possible foundation for any viable product," he stated.

"Other programs in use by architects and engineering firms are capable of factoring in building costs," Baker added. "But what is different in the software program developed by 3D/International is that it is capable of measuring—in virtually seconds—just about anything connected with a project's construction costs and its long-term performance."

Cushman Realty Leasing Broker for Water Garden

Cushman Realty Corp. will serve as leasing agent for the planned \$300-million Water Garden, a 1.26-million-square-foot office complex in Santa Monica as a joint venture of J.H. Snyder Co. and California Federal Savings & Loan Assn. Construction will begin this summer.



19 Oct 88
TOM WICKER

Some companies have been feeding themselves

NEW YORK — Here is a tale of free enterprise at work that will gladden the heart of every capitalist who manages to avoid paying taxes:

Under the Federal WIC (Women, Infants and Children) program, about \$1.8 billion a year (\$1.9 billion now, in fiscal 1989) has been going to a special supplementary food program for low-income pregnant women and children under 5 years old with nutritional deficiencies. About a third of the money — the most for any single item — goes for vouchers that can be exchanged at grocery stores for infant feeding formula.

Unfortunately, these funds have been aiding nutrition for only 1.1 million infants, 1.7 million other children under 5, and 900,000 pregnant women — half the 7.4 million eligible people. A primary reason is that in the first eight years of the program, the price of infant formula rose about 100 percent — compared with an approximate 20 percent rise for milk and 30 percent increase for groceries generally. Congress increased the funds, but the rising formula price absorbed the additional money.

Two years ago, Oregon and Tennessee authorities, hoping to make their share of the WIC money go further, decided to ask for competitive bids on infant formula. Their aim was to buy from the company that offered the state the biggest rebate on the price of formula. The state's vouchers then would be issued only for that company's formula.

At the time, three companies were making and selling the infant formula. Ross Laboratories had approximately 55 percent of the national market. Mead-Johnson had a 35 percent market share, and Wyeth Laboratories had most of the rest. Vermont and Mississippi bought formula from one company at the lowest price, but the other

states, for various reasons, did not want to follow their procedures.

When Tennessee first asked for competitive bids, none of the three companies made offers for that state's sizable market. Instead, a lobbying effort was mounted to persuade Congress to rule out competitive purchase policies; but Congress refused. Wyeth, the smallest of the companies, then offered a lower price and won contracts from Tennessee and Oregon.

The other companies, instead of entering the bidding, offered states a 20-cent rebate per can of formula, on condition that competitive bids not be demanded. Some states agreed but Texas, one of the major markets, followed the lead of Oregon and Tennessee and asked for bids.

The companies protested to Texas health authorities and the legislature. Once again they lost, and the state continued its call for bids. Not wanting to lose a market of that size, Mead-Johnson bid and won with a proposal for a \$1 rebate per can of formula against the established wholesale price of \$1.45.

Florida and Alabama took a look at that result and asked for bids, too; and Tennessee asked for a second round of price proposals. Florida grabbed an offer of a \$1.08 rebate. Alabama got \$1.17 and Tennessee \$1.25 — all off the \$1.45 wholesale price.

Since then Minnesota has won rebates of \$1.15 per can, Pennsylvania and New York \$1.12, and New Jersey \$1.10.

Does anyone have to ask why the companies were charging \$1.45 for a product on which they now can afford to give rebates ranging from \$1 to \$1.25 per can? Or who, until the states began to get wise, got most of the money Congress intended for the nourishment of poor women and children?

Curbs Are Put on The Competition Within UC For Top-quality Faculty

University of California campuses compete not only with the likes of Harvard and Columbia for quality faculty; they also compete with each other for these teachers and researchers. With recruitment costs escalating nationwide, the UC administration moved this summer to limit the costs of in-house competition for faculty.

In July, President Gardner issued a formal set of guidelines that places restrictions on what one UC campus may do when it is going after a faculty member from another UC campus.

The guidelines set limits on the salary increases that can be offered to get faculty to move from one UC campus to another; they require presidential approval of any intercampus recruiting packages that involve more than \$250,000 in "start-up" or other incentive funding; they call for early notification of intercampus recruiting; and they formalize a role for the president as a mediator in intercampus recruiting cases.

The rationale behind the guidelines is straightforward: An individual UC campus may benefit by recruiting a star faculty member from another UC campus, but the University as a whole is simply paying more money to have the same faculty.

William Frazer, UC's senior vice president for academic affairs, points out that there are benefits to be accrued from intercampus recruiting; the "receiving" campus may, for example, get just the faculty member it needs to round out a particular research area within a department. On the other hand, he adds, "When we're spending the state's money, or other resources, we have to be able to convince ourselves that it's being spent in the furtherance of the overall goals of higher education in California."

The guidelines are the first formal set of rules to be implemented by the University on the subject of intercampus recruiting, outside of an informal understanding—perhaps once issued as rule—that apparently existed during the 1960s regarding the salary increases that could be granted in such cases. In recent years, however, this limitation seems to have been forgotten. The competition nationally for top-rank faculty has never been greater than in recent years, and UC has found itself joining many other research universities in faculty bidding competitions that include large salaries and, on some occasions, hundreds of thousands of dollars in "start-up" costs for such things as new labs and equipment.

(Please See: Internal, Page 4)

Gloomy Outlook in State Budget Picture Means UC Won't Seek 1989-90 Program Improvements

Seeing a constrained state fiscal picture ahead, the University of California announced in September that it will not seek money from the state for improvements at UC in the coming year; rather, the University will try to hold on to what it has. It is not certain, however, that even this goal can be achieved. The announcement came as UC was deciding how it is going to deal with a cut in its operating budget for this year that amounts to about \$30 million.

In a sharp break with tradition, UC will not ask the state to fund a set of "program improvements" for next year—such things as new research initiatives, more instructional computers per student, or better library equipment. Rather, as William Baker, UC's vice president for budget told the UC Regents, "We will be presenting a budget request that has the single objective of maintaining the University's resource base adjusted to accommodate inflation, fixed costs, enrollment growth and salaries."

The budget Baker referred to is for the 1989-90 fiscal year, which begins next July 1. President Gardner made the decision not to seek improvements for '89-90 because of the difficult financial situation that appears to lie ahead for the state.

This situation has come about for several

reasons. The billion-dollar shortfall in state revenue discovered in April, which confounded the state's budgeting process this year, still has not been corrected. Gov. Deukmejian's stated intention to rebuild a state funding reserve of \$1.1 billion will require \$500 million before other items can be funded. Also, it's expected that the state will provide permanent funding to California's counties for trial courts, which, Baker said, should cost another \$200 million. Finally, there is the so-called "Gann limit" on state spending which, state planners predict, will limit state spending growth in the coming year to about 7 percent.

In contrast, Baker told the Regents, "The University needs an increase of about 10 percent just to stay even"—to fund the student enrollment growth that's expected, salary increases, inflation, and fixed costs. "Based on what we know about the state's situation at this time, it's extremely unlikely that we could get an increase higher than 10 percent in order, for example, to fund some program improvements," Baker said. "Realistically, it is even questionable if we can get the 10 percent that is needed to preserve the purchasing power

(Please See: Budget, Page 4)

Probable Five-percent Increase in 1989-90

Effective Date for UC Faculty Salary Increases Is Likely to Be January 1 for Next Two Years

UC faculty seem likely to get a pay raise of about 5 percent in 1989-90, but the increase appears destined to add money to paychecks for only six months of that year. Any raise in 1990-91, should likewise be effective for only half the year.

William Baker, UC's vice president for budget and university relations, told the UC Regents in September that the University's "best estimate" of 1989-90 faculty salary increases is about five percent. This increase represents the so-called range adjustment, which affects what University employees in different positions will be paid—for example professors at the various steps and ranks. It is separate from "merit" increases that may be granted to individual faculty as they move up through the ranks.

UC uses a comparison methodology to set

salary levels for its faculty. UC salaries are compared to those of faculty from eight similar research institutions around the country. (They are: Harvard; the University of Illinois, Urbana-Champaign; the University of Michigan, Ann Arbor; Stanford; Yale; the State University of New York, Buffalo; the Massachusetts Institute of Technology; and the University of Virginia.) Preliminary information on the salaries of these institutions yielded the 5 percent increase estimate. More precise information will be available in November, when the UC Regents are presented with a final administration recommendation for the increase.

The exact amount of the salary increase may, however, be less important to UC faculty than the schedule under which it is put into effect. The University's fiscal year begins on July 1, which is also the traditional date on which salary increases have been put into effect. At the Regents' meeting, however, Baker reported on a multi-year package, worked out in August between the governor and the California leg-

(Please See: Salaries, Page 2)

**Inside Notice:
The Importance
Of Proposition 78**

MOP and MORE Carry Low Interest Rates, Good Terms

Two Loan Programs Offer Faculty Help with High Cost of Housing

Faculty who are new to the University of California—or simply new to California's high-priced housing market—stand to benefit considerably from taking part in either of the two programs UC runs to aid its faculty in buying homes.

One program is called MOP, for Mortgage Origination Program; the other is called MORE, for Mortgage Revenue Bond program. Though quite different in specifics, both exist to provide low-cost housing loans to eligible UC faculty.

MOP provides variable-rate 30-year loans, with interest rates that generally are better than those available at commercial lending institutions. As of this month, for example, the rate stands at 7.85 percent. There are other benefits

to the program as well. Most one-time costs, such as title, escrow, and inspection fees, are paid by the program; no application fees or origination points are charged; the down payment required is only 10 percent of the purchase price; and the mortgage payment-to-income ratio—the amount of gross family income that can go toward the home loan—is 40 percent, compared to the 28 percent used by most institutional lenders.

The maximum adjustment in interest rates for MOP, up or down, is capped at 1 percent per year, and the rate is adjusted on the anniversary date of the loan. Faculty are eligible to apply for MOP only if they do not own a principal place of residence within a reasonable

distance of the campus at the time they apply for the loan, and loans are available only for a single-family residence (including condominium units). The Office of the President sets no maximum loan amount, but individual campuses may adopt loan limits in order to serve a greater number of faculty, or for other reasons.

In contrast to MOP, MORE, the University's other housing program, offers fixed-rate loans, with an interest rate of 7.95 percent. Because it is financed by a University bond issue, MORE mortgages have a maturity date of August 1, 2017; thus the term of each loan is for slightly less than 30 years, depending on the closing date. This would mean higher payments each month than a full 30-year loan would entail, but the difference is slight.

Because MORE is made possible by federal tax provisions, some federally mandated restrictions apply to the program. With few exceptions, MORE loan recipients may not have owned a home for three years prior to applying. Further, housing purchase prices may not be more than 110 percent of an official Average Area Purchase Price. To give some idea of the range of home prices this provision allows, the maximum price currently allowable for an existing home in UC's least expensive housing area, Riverside, is \$122,210; by contrast, in UC's most expensive housing area, San Francisco, the maximum price allowable is \$236,942. The maximum MORE loan available is \$190,000.

(Please See: Housing, Page 4)

UC Benefits Roundup

Formula Change Means More Money for Retirees

University of California Retirement System (UCRS) annuitants who retired from the University after having reached age 63 should be seeing about 5 percent more in their annuity checks beginning immediately. The improvement is one of several changes in benefits the UC Regents approved in September.

The annuity change has come about thanks to an alteration of the UCRS "age factors." UCRS members who retired after age 60, but before reaching age 63, likewise should see annuity increases, but of somewhat lesser amounts than 5 percent. The change the Regents approved will affect all future UCRS annuitants who retire at age 60 or above and is retroactive to July 1 of this year.

UCRS benefits are calculated under a formula that takes three things into consideration: salary level, service credit—the length of time a person works for the University under coverage of the pension plan—and a multiplying factor based on age at retirement. The later a person retires, the larger this "age factor," and thus the larger that person's retirement annuity.

Traditionally, there has been a parallel relationship between UCRS and the State of California's Public Employees Retirement System (PERS) in terms of benefits provided. In general, the state tries to fund comparable benefits for both programs. However, for retirement at age 60 and above, the PERS age factors have for some time been higher than the UCRS age factors. In September, the UC Regents approved a plan to bring the UCRS age factors into line with those of PERS for 60-and-over annuitants. Since the PERS and UCRS factors differed most significantly for ages 63 and above, annuitants in that age group stand to get the largest increase.

In other benefits news, in September the

Regents also approved a cost-of-living adjustment (COLA) for 2,300 UCRS annuitants, aimed at restoring the UCRS benefits they receive to 75 percent of their original purchasing power. The amount of adjustment annuitants will receive depends on the date on which they began receiving benefits. Some annuitants are already at or above the 75 percent level and thus will receive no adjustment; others will receive adjustments ranging from about 2 to 7 percent.

This is the 11th time the Regents have approved such an ad-hoc COLA since 1957. The periodic adjustments are necessary because, unlike PERS, UCRS has no guaranteed COLA that insures that the purchasing power of annuitants will be maintained at a given level.

Finally, as of January 1, 1989, UC employees will no longer be able to apply UC's dental or optical insurance contributions to their UC tax-deferred annuity accounts. UC provides dental and optical coverage to all eligible employees, but some of these workers don't need this coverage. (If, for example, a spouse has similar coverage, the UC protection might be unnecessary.) Through this year, these employees have been able to apply University dental and optical contributions to their TDA accounts, but changes in federal tax laws dictate that these University TDA contributions must cease by January 1.

Therefore, effective on that date, employees who were receiving University TDA contributions will automatically be enrolled in single-party optical and single-party Delta Dental coverage. Employees in this category who wish to utilize UC's dental alternative—or who wish to add dependents to dental coverage—may do so in the "open enrollment" period that takes place this coming month. Changes may also be made in future open enrollment periods. ■

Salaries: Half-year Increases Are Likely

(Continued from Page 1)

islature, that will affect upcoming state-funded salary increases. Under the plan, salary increases for next year—and for the year after that—will be effective mid-year: on January 1, 1990 for the 1989-90 year, and on January 1, 1991 for the 1990-91 year. One positive effect of the salary package is that it commits the state to using the "comparison-eight" formula in setting the amount of the faculty salary increase for both years.

The deferral of salary increases called for over the next two years is an improvement over what will happen this year. The state budget crisis sparked by the April discovery of a shortfall in tax revenues has resulted in an 11-month deferral of faculty and staff salary increases for 1988-89. Prior to the discovery of the shortfall, faculty seemed headed for a 3 percent salary increase for the year, effective January 1, 1989. The budget situation pushed that deferral back an additional five months; the 3 percent increase now will be granted on June 1. Baker has said he is not optimistic about the chances of the University returning to a July effective date for salary increases in the foreseeable future. ■

News in Brief

Performance Reviews

In July, the Senate's Academic Council endorsed a resolution that calls for every faculty member at the University of California to undergo a performance review at least once every five years. The Office of the President has begun seeking comments from campus administration officials on the Council's resolution. Ellen Switkes, UC's director of academic personnel, says it's likely there will be little opposition to the Council's position on the review issue; if so, mandatory five-year review seems likely to be instituted at UC by directive from President Gardner during this academic year.

David Mosier of Irvine, immediate past chair of the Senate's University Committee on Academic Personnel (UCAP), said UC faculty rarely go as long as five years without being reviewed, but that administration action on the issue would insure that there are no such cases at the University. He said the problem could arise, for example, with professors at step five or six who might elect not to be reviewed because of a lack of research productivity.

Emeriti Voting to Assembly

The issue of what Senate voting rights emeriti faculty have will come before the Senate's Universitywide Assembly at its November meeting in Berkeley. The Assembly will consider a proposed amendment to the Senate Bylaws, drafted by the Academic Council, that calls for emeriti as a class to generally be accorded the full rights of a member of an academic department, but to be prohibited from voting on academic personnel matters and allowed to vote on other departmental matters only by two-thirds vote of the members of a department who vote on the issue. The proposal was approved in May by the Council; its suitability for submission to the Assembly subsequently was reviewed by the Senate's University Committee on Rules and Jurisdiction.

Agriculture Vice President

Toby R. Winer, a former associate vice chancellor for finance at Vanderbilt University, has been appointed to the newly created position of assistant vice president for administration in UC's Division of Agriculture and Natural Resources.

Winer, 36, will join the University at the division's Oakland headquarters this month. As assistant vice president, she will oversee the division's \$200 million annual budget. She will manage contracts and grants, accounting, information systems, personnel services and affirmative action. She also will have administrative responsibility for nine agricultural field stations and other off-campus facilities.

Prior to joining Vanderbilt University in 1985, Winer was controller and vice president of finance and administration at Comp-U-Card International Inc., in Stamford, Conn., a firm specializing in computerized marketing. ■

Commentary: Proposition 78

By Arnold Binder

By the end of the decade that started in 1980, the University of California will have grown by about 26,000 students. To anchor a feel for the capital needs associated with that sort of growth, consider that there were approximately that many students enrolled during 1987-88 on the Irvine, Riverside, and Santa Cruz campuses combined. And to embellish that feel with some foreboding, current projections indicate that there will be another increase in the number of students during the 1990s of only slightly less than that of the 1980s.

Anxiety enters into the set of reactions of administrators and the most active Senate members when certain other considerations are thrust into the picture. These include woefully inadequate budgets for new facilities between 1974 and 1983 (under 10 new buildings were constructed using state funds during that period on all nine campuses); a shift in student interest to engineering, computer sciences, and the biological sciences—all requiring considerable laboratory space and equipment; a substantial need for the renovation of buildings on all campuses and the infrastructures of the older campuses; and serious concern about the safety—primarily seismic and asbestos—of many UC facilities.

A measure aimed at partial relief of the bind in capital funding (as well as of the collective anxiety of many) will appear as the first item on the state ballot in November as Proposition 78. It will ask voters for approval of \$600 million in general obligation bonds—that is, bonds backed by the state's taxing authority and repaid from the General Fund—to fund capital projects for a two-year period over all three segments of the state's higher education system.

In 1988-89, UC would receive \$121.3 million of that amount to fund future construction, renovation, safety correction, capital planning, and minor improvement of facilities. The actual projects include construction of space for the social sciences at UCD and for chemistry and the biological sciences at UCLA, renovation of facilities for engineering and computer science at UCSD and natural sciences at UCSC, seismic safety corrections at UCB and UCSD, planning a science library at UCI and an earth and marine sciences building at UCSC, and improvement of access for the handicapped at UCB, UCSC, and UCSD.

It should perhaps be pointed out in passing that UC's capital budget for 1988-89 is \$185.5 million rather than the \$121.3 million referred to above. The difference of \$65.4 million will come from the sale of High Technology Education Revenue Bonds by the State Public Works Board. About 80 percent of that amount will be used for hospital projects.

We in the Academic Senate who have worked closely with campus or statewide administrators in the development of the capital budget consider approval of Proposition 78 to be critical for the University. It will surely not eliminate the many problems that we face on a daily basis—incredibly crowded classrooms, the unavailability of classrooms during many hours of the day, the lack of laboratories for new and continuing faculty members, and the absence of adequate office space for many deserving graduate students, most of whom are TA's and RA's.

Indeed, the estimated capital needs of the University are \$400 million per year, until at least the year 2000, to compensate for prior and developing deficiencies, and to accommodate anticipated growth. (Of that \$400 million, it is hoped, perhaps with more idealism than realism, that about half will come from non-state sources, including the federal government, business and industry, and private sources.)

If Proposition 78 is not the whole answer, it is, nevertheless, an essential element in the process of keeping UC at the level of excellence it has attained. The loss to us would be enormous if approval is not voted—in actual capital results as well as in precedent.

Arnold Binder is professor in the Program in Social Ecology at UC Irvine and immediate past chair of the Academic Senate's University Committee on Planning and Budget. ■

Pay Raises, Start-up Costs Controlled Internal Recruiting: Limits Set Under New Policy

(Continued from Page 1)

UC, however, is so large that, almost alone among university systems, it must deal with the problem of internal competition for faculty. Frazer says that among American universities, only New York's SUNY system is remotely comparable in having a large number of research campuses under its umbrella.

The Academic Senate's University Committee on Academic Personnel (UCAP) discussed the administration's guidelines last year as they were being drafted and suggested a change that was included in the rules that were finally issued: an upward revision of the start-up cost approval level from \$100,000 to \$250,000. On the whole, the guidelines were accepted by the committee and there has been no discernable faculty protest over them since they were issued. Some of this might have been expected, since the rules amount to an administrative limitation on a free market for faculty services.

Thus far, President Gardner has not restricted any intercampus recruiting offer, Frazer said. He added, however, that there have been a fair number of inquiries from vice chancellors asking for guidance on the new rules. The president's office has, in the past, served to mediate intercampus recruiting cases; the new rules have the effect of formalizing this role.

The new guidelines are set forth in four provisions. First, when one UC campus pro-

poses recruiting a faculty member from another UC campus, "the Chancellor of the recruiting campus will notify the other Chancellor at the earliest possible moment that such a proposal is under review, and will provide details as to proposed salary, and other recruitment inducements that are being proposed." Second, a recruiting campus can offer a salary no more than one step, or its equivalent, above the faculty member's current salary. Third, "Presidential approval must be sought if the package of start-up costs and other inducements (excluding housing assistance) exceeds \$250,000." And fourth, in any intercampus recruitment, either chancellor may request "mediation or intervention" by the president. ■

Housing: Loan Programs Provide Help for Faculty

(Continued from Page 2)

Both purchase price and prior ownership restrictions are eased in MORE if the house being bought lies within a so-called "targeted area"—generally census areas in which at least 70 percent of all households earn less than 80 percent of median income.

MORE has been used predominantly by newly hired, younger UC faculty; MOP has been used more by senior faculty, as it allows higher purchase prices. In the last two years, 35 percent of all newly recruited UC faculty have gotten housing loans through one of the two UC programs. Only Academic Senate members, or persons with equivalent titles, are eligible for the programs. Each applicant must be designated by the campus' chancellor's office. Both department chairs and campus home loan coordinators have information on the programs.

Here are the loan coordinators for each of the UC campuses. Berkeley, Dorothy Padilla, 642-3190; Davis, Diane Mundy, 752-3646; Irvine, Jane Foley, 856-5801; Los Angeles, Kate Kiroff, 825-9034; Riverside, Jay Hughes, 787-3201; San Diego, Christine Sullivan, 534-0099; San Francisco, Diane Dillon, 961-3811; Santa Barbara, Diane Johnson, 961-3811; Santa Cruz, Elise Levinson, 458-3506. ■

Budget: UC Aims for Status Quo in '89-90 State Funding Request

(Continued from Page 1)

of our base budget and to fund the costs associated with enrollment growth."

The announcement on the budget for next year came only a few weeks after a legislative package was put together that reduced, by nearly half, the \$64 million cut in funding it appeared the University would have to take for this year's budget. About \$31 million was restored to the University's budget; UC has been able to make up a little more of the deficit—about \$4 million—by raising nonresident tuition.

Together, the additions mean that UC is no longer contemplating taking the action President Gardner proposed in July for dealing with the budget cuts: rolling back fall 1989 admissions to 1987-88 levels. This response would have meant that some eligible California students would, for the first time, have been denied admission to UC. Bold as the response was, it was widely supported within the University and outside of it. In July, the Senate's Academic Council unanimously passed a resolution supporting the president and his plan to deal with the budget crisis. In Sacramento, Baker told the Regents, "Access to the University was a repeating theme during the August legislative session, and was an essential element in bringing about the solution that was finally reached."

The August restoration of funds still leaves UC with a cut of about \$30 million to make up for this academic year. Vice-president Baker said that the University is looking at a number of options to deal with this, including deferring equipment purchases and delaying certain program improvements.

The restoration of funds did nothing to change the deferral of salary increases for UC faculty and staff brought about by the original budget cuts. Faculty still are scheduled to get a 3 percent increase in salary on June 1, 1989. The state's original budget plan, moving toward completion before the revenue shortfall was uncovered, called for the 3 percent increase to be granted on Jan. 1, 1989. [For more on faculty salaries, see related story, page one.] ■

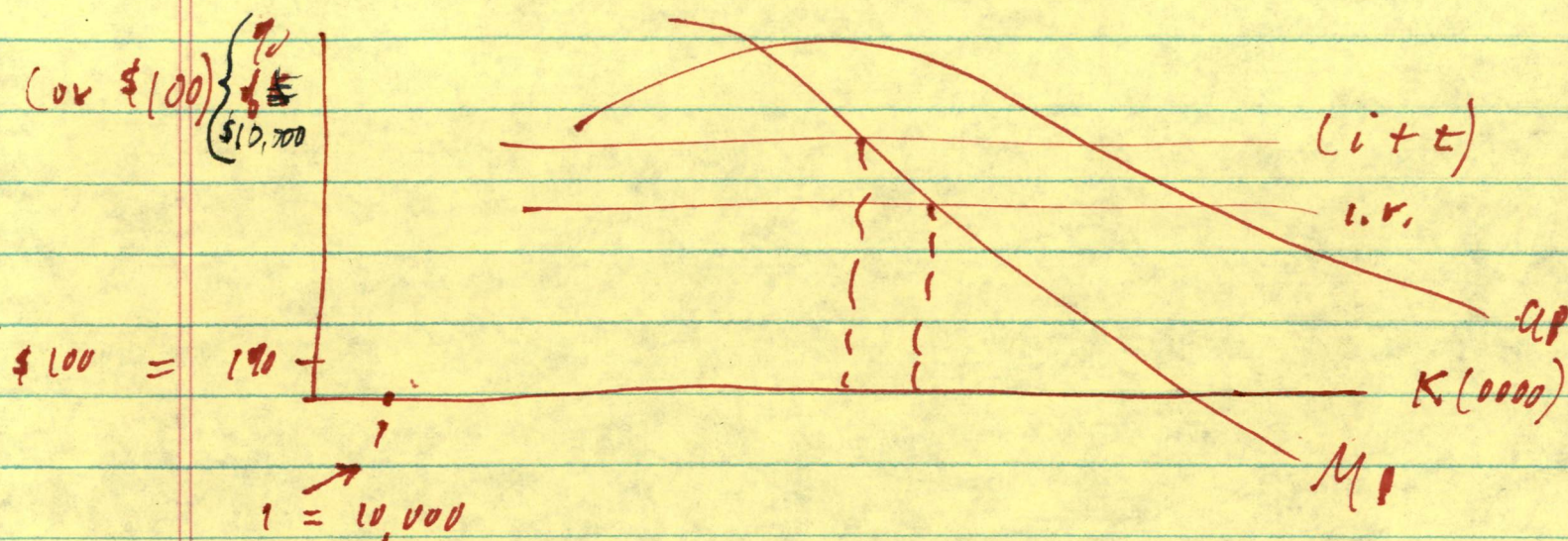
Notice

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Bldg Tax



$\neq 29$, by K as mgr's indep. vble.

Wed 5 Oct, 88

1

- 0. Case of HH ac. $MP = MNP$
- 1. MP of Wayne Gretzky

- 2. a. Simple route to opt: $MP = MC$

Fallacy of max AP

" " " MP

" " " TP

(e.g. of "L.U." in BC forests)
or "low-grading" mines

- b. Show net gain

- c. Show AP max is opt. if W.R. high.

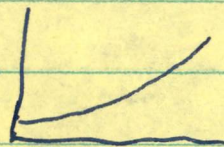
- 3. Intensive & extensive margins.

Time Value

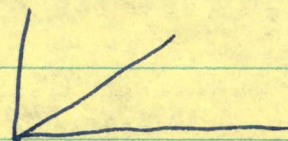
P + L is too basic. Will supplement.

$$F = P I^n$$

PIPO

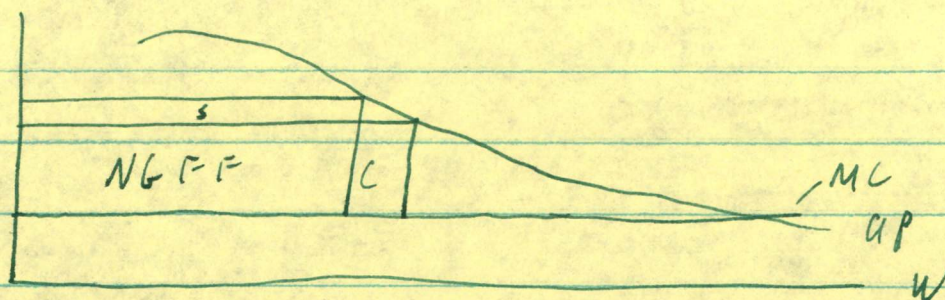


$$\ln F^n = n \ln F \approx ni$$



Rule of 72

Max NGFF



$$C = w' \left[\frac{P}{w} - MC \right]$$

$$-S = \rightarrow w \frac{d\left(\frac{P}{w}\right)}{dw} = w \frac{wP' - Pw'}{w^2} = P' - \frac{P}{w} \quad (w'=1)$$

$$= MP - AP \neq$$

NGFF max when $C = S$

$$\frac{P}{w} - MC = -\left[P' - \frac{P}{w}\right] = \frac{P}{w} - P'$$

$$MC = P'$$

QED

$$\neq \text{ So } S = AP - MP \quad (= AP(1 - \epsilon))$$

$$C = AP - MC$$

$$C = S \text{ when } MP = MC$$

2nd approach:

$$\cancel{\frac{P'}{P} = \frac{w'}{w}} \quad \frac{w'}{w} = - \frac{d[AP - MC]}{\frac{dw}{AP - MC}}$$

$$\frac{1}{w} = - \frac{\frac{wP' - Pw'}{w^2}}{\frac{P}{w} - MC} = - \frac{wP' - P}{wP - MCw^2} = \frac{P - wP'}{wP - MCw^2}$$

$$P - wMC = P - wP'$$

$$wMC = wP'$$

$$MC = P' = MP$$

Q.E.D

Campus expansion
illustrates 3 ways of responding
to Δ demand

2nd way: use FF for enter-
prises services move students

Responses to energy crisis

A. Alt supplies

Wood fuel: NE logs; hog fuel - bark + sawdust; Euc.; mesquite

Nuclear

Geothermal

Wind

Solar; photovoltaics

Micro-hydro

Fuc, meters running backwards, wood cut - instl.

Cogeneration

change

Gasohol

Jobs

Incineration of mun. waste: Kaiser; tire-burning plant

Shale oil

Lignite

Arctic expln. Geo sat. Swedish Siljan Ring

Oil from coal.

B. Reduced demand. Falling of fixed coeffs.

Fans; swamp coolers; turks

Higher temp in summer

Insulation

Compact cars

Wed. 10th wk. '88

1. Rpt. Why concerned w. Turnover?
Your liquid K, or discretionary funds, is mostly what you recover ea. yr.

And your ROR is fn. of T. Better to make 6% twice than 10% once, — in same pd. of time. Donaldson Brown.

U.S. K/o ratio ≈ 3 . New firms have to do better.

2. Rules for max T
- a. Rent space.
 - b. Lease durable equipment
 - c. The pantyhose principle: stock pantyhose (& keep in back of store).
 - d. Hustle
 - e. Save, so you can break out of this, cash in on special opps. for patient money.

3.

Inventory Turnover model. pp. 473-75

$$D = \text{sales}$$

$$X = \text{size per order (proxy for } n, \text{ or life of } K)$$

$$k = \text{int} + \text{storage cost per unit}$$

$$TC_I = k \frac{X}{2}$$

$$\frac{D}{X} = \text{no. of orders / yr.}$$

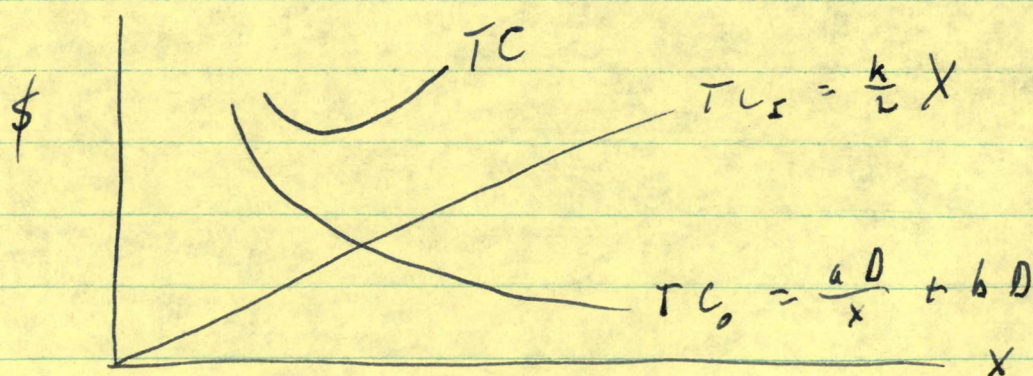
$$b = \text{cost / "set"} \quad (\text{"set"} = \text{unit, in this case TV})$$

$$a = \text{cost / order} \times \text{eq. costs of eq. order. (Proxy for diseconomies of short life)}$$

$$a + bx = \text{cost of eq. order}$$

$$TC_o = \frac{D}{X} (a + bx) = \frac{aD}{X} + bD$$

$$\text{Min } TC_I + TC_o$$



By using proxies, this also tells you much about replacement timing.

Fri. 6 Oct 88

1. Answers to quiz.

2. $1 + 1 \cdot i = 1 + i = I$

~~$1 + i$~~ $I + iI = I(1+i) = I^2$

$I^2 + iI^2 = I^2(1+i) = I^3$

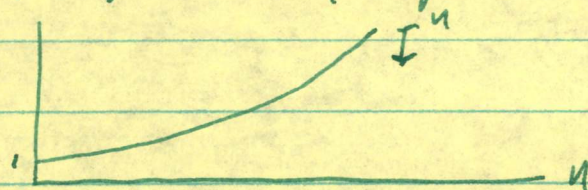
3. Rule of 72 $\xrightarrow{\text{For ballpark ests (rule of thumb; order of mag.)}}$ $1.072^{60} = 2.0042$

Cf $1.072^{60} = 64.8$

$\frac{72}{7} = 10.29$

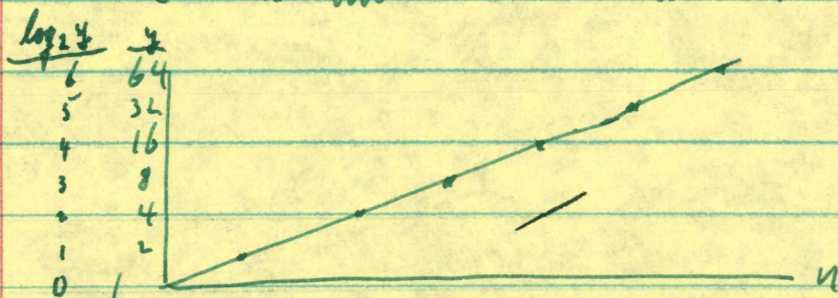
$1.1029^{42} = 61.2 \rightarrow \text{total } 1.1029^7 = 1.985$

4. Shape of curve of exponential growth.



Const. % growth; rising base
2 curves of same rate are
|| horiz., not vertically.

(Area under curve has meaning: is FV of $a=1$)



|| vertically means
same growth rate.

Semi log scale. Const. doubling time.

$\ln I^n = n \ln I \approx ni$

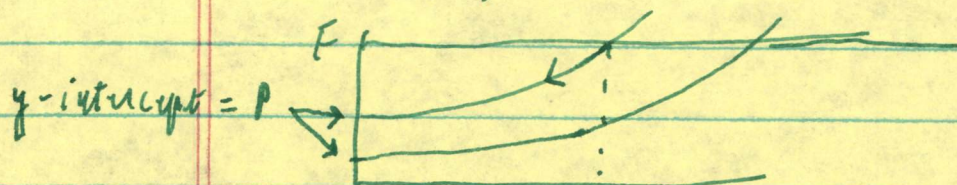
Use calcs. to check $\ln I \approx i$

Esp. w. monthly int. low rates.

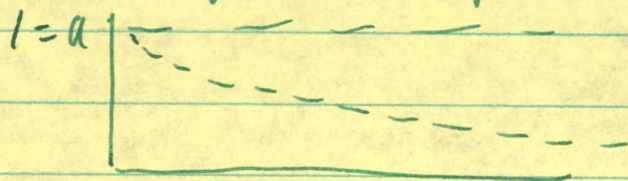
5. Meaning of discount's.

$$F = I I^n$$

$$P = F / I^n = F I^{-n}$$

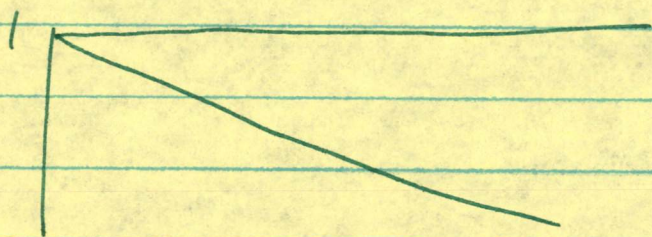


Curve of exp. decay. Collect the y-intercepts on one line.



Const. % decay[≠]; falling base

Area under curve means PV of $a = 1$



Anti-log scale. Const. halving time.
Curve is mirror image of growth curve.

^{drops}
≠ Decay curve ~~falls~~ by i of the unit it is falling to; growth curve rises by i of the unit it is rising from.

6. Enormous power of compounding

$$1.10^7 \approx 2$$

$$1.10^{7 \cdot 6} \approx 2^6 = 64$$

Order of magnitude, or ballpark est.

$$1.10^{\frac{1}{12} \cdot 12 \cdot 84} = 2^{12} = 64^{12} = 4,096 \text{ in } 84 \text{ yrs.}^{\#}$$

Cf. simple interest. $1 + n \cdot i = 1 + 84 \cdot 0.1 = 9.4$

7. Enormous power of discounting.

@ 10%

PV of 100 when $n =$ P ~~@ 10%~~

20 14.9

40 2.21

60 0.33

80 0.05

This is why PV of yr. soc. sec. retirement kitty is so low when you are 18. $65 - 18 = 47 \text{ yrs.}$
 $1.1^{-47} = .0113$. Those are 14 dollars.

[#] Compounding also has enormous power to magnify small errors. It is actually ~~1.1039^{84}~~ $1.1039^{84} \neq 4,037$ $1.1041^{84} = 4,099$

8. Disc. factor as rate of exch. betw. points in time.
Commensurability. "Sci. is invariant."

9. Getting full use from comp. form. Solve for n & i .
Has 4 terms.

Solve for i

$$F = P I^n$$

$$I = \left(\frac{F}{P}\right)^{\frac{1}{n}}$$

$$i = \left(\frac{F}{P}\right)^{\frac{1}{n}} - 1$$

i is ROR. Sensitive to $\frac{F}{P}$, obviously.
Equally so to n -- not so well known.

Turn it over fast! Hustle

$$F/P = 3$$

Sensitivity

$$I = \left(\frac{F}{P}\right)^{\frac{1}{n}}$$

$$\ln I = \frac{1}{n} \ln \left(\frac{F}{P}\right)$$

~~Bullpark!~~

$$i \approx \frac{F/P - 1}{n}$$

for $i \ll 1$!

$$i \approx \frac{\ln F - \ln P}{n}$$

But $\ln P = 0$

$$i \approx \frac{\ln F}{n}$$

Bullpark! $i < .20$

n	i
1	2.00
2	.73
3	.44
4	.32
5	.25
6	.20
10	.116
15	.076
20	.056

For $i > 20$, go to shorter time units. Monthly is standard. Let $n = \text{no. of months}$

<u>n</u>	<u>i</u>	<u>Bull put i</u>
12	.096	.092
24	.047	.046
36	.031	.031
48	.023	.023

For 100% accuracy, use calc.

$$F = Pe^{pn}$$

$p = \text{cont. int. rate}$

$$P = 1$$

$$\ln F = pn$$

$$p = \frac{\ln F}{n}$$

$$(1+i)^n = e^{pn}$$

$$1+i = e^p$$

$$p = \ln(1+i)$$

$$i = e^p - 1$$

$$(\text{e.g. } e^{.24} - 1 = .271)$$

$$(1.02^{12} = .269)$$

invest but essential

10. Modifying ROE for "catalytic agents" - necy. to a chem. reaction, but not part of it - i.e. not lost upon sale. Re-usable: you recover them in kind.

E.g. floor space for furniture being sold.

Land occupied by trees, cattle

$$i = \left(\frac{F + S}{P + S} \right)^{\frac{1}{t}} - 1$$

S reduces ratio: "dilutes" the gain.

Even if F rises, so long as: $\frac{F}{P} < \frac{F_1}{P}$

$$\frac{S_1}{S_0} < \frac{F}{P}$$

If $S_1/S_0 > \frac{F}{P}$
forget about F/P , invest
in S_0 .

$$\frac{F + S_1}{P + S_0} > \frac{F}{P}$$

~~$$PF + FS_0 < PF + PS_1$$~~

~~$$\frac{F}{P} < \frac{S_1}{S_0}$$~~

$$PF + PS_1 > PF + S_0 F$$

$$\frac{S_1}{S_0} > \frac{F}{P}$$

11. Solve for n

$$F = P I^n \quad P = 1 \quad F = I^n$$

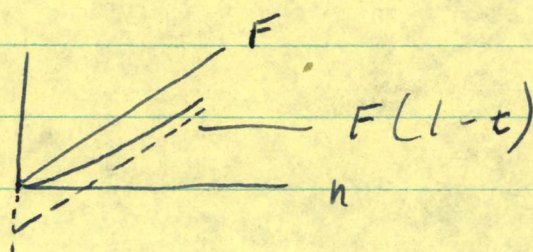
$$n \ln I = \ln F$$

$$n = \frac{\ln F}{\ln I} \approx \frac{\ln F}{i}$$

Can be taken from Eqn. on p. 4, between rt.

1. Simple case
- a) No deduct P. $r = \left(\frac{F(1-t)}{P} \right)^{\frac{1}{n}} - 1$
- a) Deduct at n

$$r = \left(\frac{F - t(F - P)}{P} \right)^{\frac{1}{n}} - 1$$



- b) Deduct at 0

$$r = \left(\frac{F(1-t)}{P(1-t)} \right)^{\frac{1}{n}} - 1 = i$$

2. Combine only inc. + pref. inc.

$$r = \left(\frac{F - t(F - P) + S_n - s(S_n - S_0)}{P + S_0} \right)^{\frac{1}{n}} - 1$$

Suppose $s = 0$

$$i = \frac{a(1 - I^{-n})}{P - RI^{-n}}$$

$r = i$ after tax, t

$$r = \frac{a(1-t)(1 - I^{-n}) + P \frac{D}{P} \frac{1}{n} \frac{1 - I^{-n}}{r}}{P - \cancel{N(1-s)} I^{-n} R(1-s) I^{-n} + sN I^{-n}}$$

$$I = 1 + r$$

$D = \text{Depreciable}$

$N = \text{Non depreciable}$

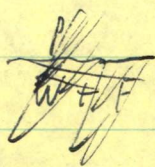
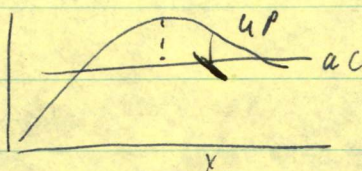
$$D + N = P$$

$$i = \left(\frac{F + S}{P + S} \right)^{\frac{1}{n}} - 1$$

$$r = \left(\frac{F(1-t) + Pt + S_n(1-s) + S_0s}{P + S_0} \right)^{\frac{1}{n}} - 1$$

21.

AP + Effic.



$$\frac{ap}{ac} = \frac{P}{C} = \text{eff.} ?$$

But max. AP gives "eff." $> 100\%$.

So some input was left out.

1 assmt.

at x ,

$$\frac{ap}{ac + ag} = \frac{P}{C + \bar{G}} \quad \text{is max}$$

($G = \text{gain}$
 $\bar{G} = \text{max. gain.}$)

$$P = ap \cdot w = (ac + ag) w = C + G$$

To ~~max~~ reach eff = 100%, expand to max G .

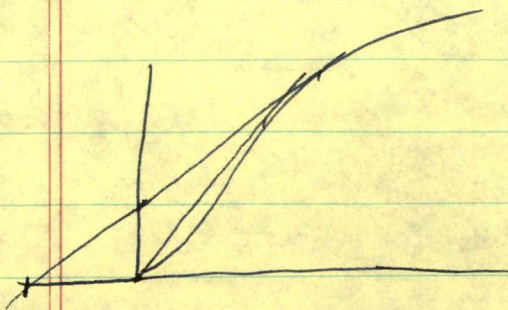
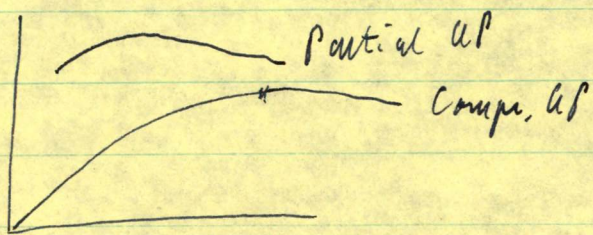
$$\text{Eff} = \frac{P}{C_i + \bar{G}}$$

$$\text{Eff} = \frac{C_i + G_i}{C_i + \bar{G}}$$

C_i same in num. + denom.

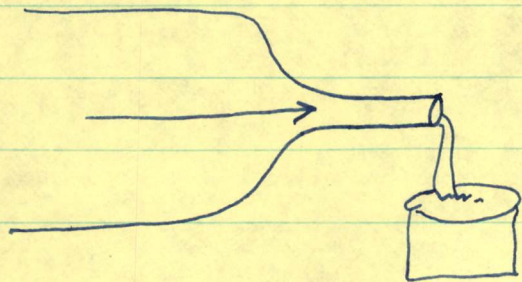
$G_i < \bar{G}$ except at x .

21



Mgt.

1. What is a bottleneck?



a choke, constraining
flow-thru.

2. Ricardo Effect.
Assign Ric. on value.

Forecasting

Lets you bring macro ideas into Mgrd Ecs.

4. Mini-macro

as many firms are vertically integrated, can pursue vertical aspect of substs.

E.g. a publisher has its own pulp mills; they have their own timber.

✓ a publisher serves 2 cities, 2 papers. He folds one, doubles ^{no. of pages} ~~printing~~ of other, ^{runs nat. synd. columns.} ~~same content~~ ~~etc.~~
Thus sub. pulp for labor.

But pulp produced by labor. Less labor-int. however.

Pulp mill switches its output mix - more pulp, less wood. Thus, uses younger trees. Makes timber culture more labor-using. So, potential reporters become foresters.

5. Mgr. must forecast.

Needs system mind for this. Avoid being stampeded.

E.g. avoid avos. when average doubling.

E.g. avoid spec. in housing when "inflation" has become a way of life.

E.g. avoid oil when OPEC will never fail, etc.

✓ System mind lets you avoid stampedes bcs. it lets

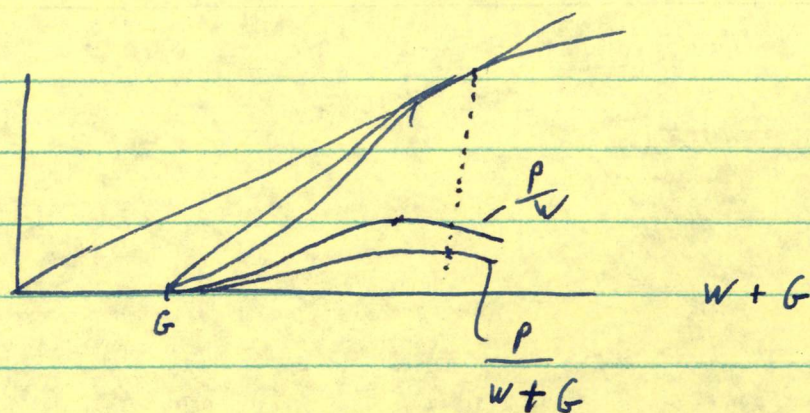
✓ you see feedback. E.g:

{ Capl. inflow into region, a reversing element
in balance of pmts., with regional mult. effect.

{ Mout. cattle-boom effect, when competitors for
consumers become complements, as new lands are
developed.

✓ (Likewise, U.S. sold machines to 3d world,
which then became competitors.)

19.



Spread the o'head.

$$\text{"Return on sales"} = \frac{P-w}{P} = 1 - \frac{w}{P}$$

Max when $\frac{w}{P}$ min, or $\frac{P}{w}$ max.

IRA

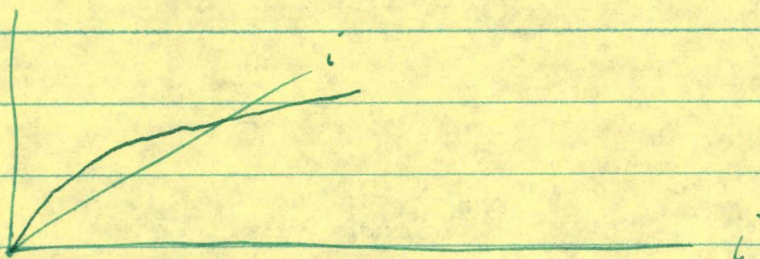
$$a = 970$$

$$p = 6964$$

$$\frac{a}{p} = \frac{97}{696} \approx \frac{100}{700} \approx .143$$

$$p = a \frac{1 - i^{-10}}{i}$$

$$i = \frac{a}{p} (1 - i^{-10})$$



$$i \quad (1+i)^{-10} \quad 1 - (1+i)^{-10} \quad .14(1 - (1+i)^{-10})$$

0

1.00

0

0

$$.01 \quad \frac{1}{1.11} = .89$$

$$.11$$

$$.014$$

.09

$$P = a \frac{1 - I^{-n}}{i} + RI^{-n}$$

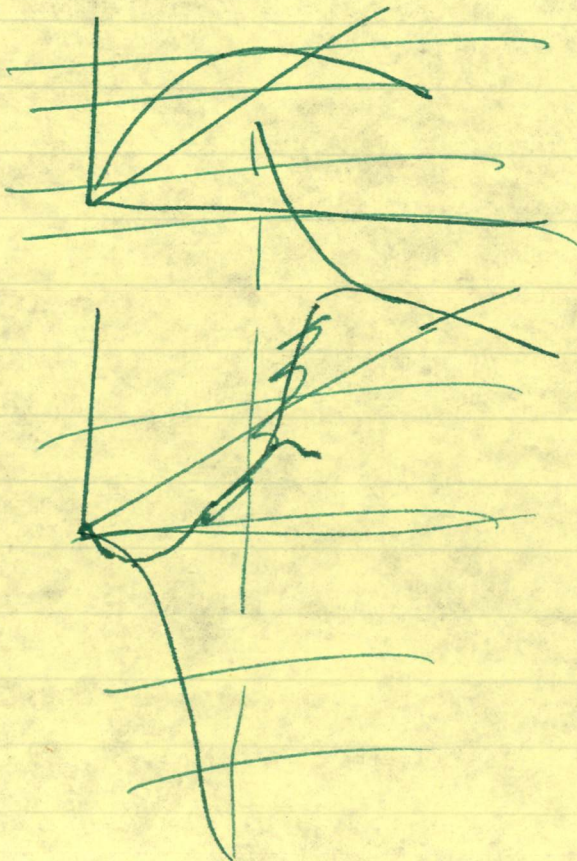
$$P - RI^{-n} = a \frac{1 - I^{-n}}{i}$$

$$i = \frac{a(1 - I^{-n})}{P - RI^{-n}}$$

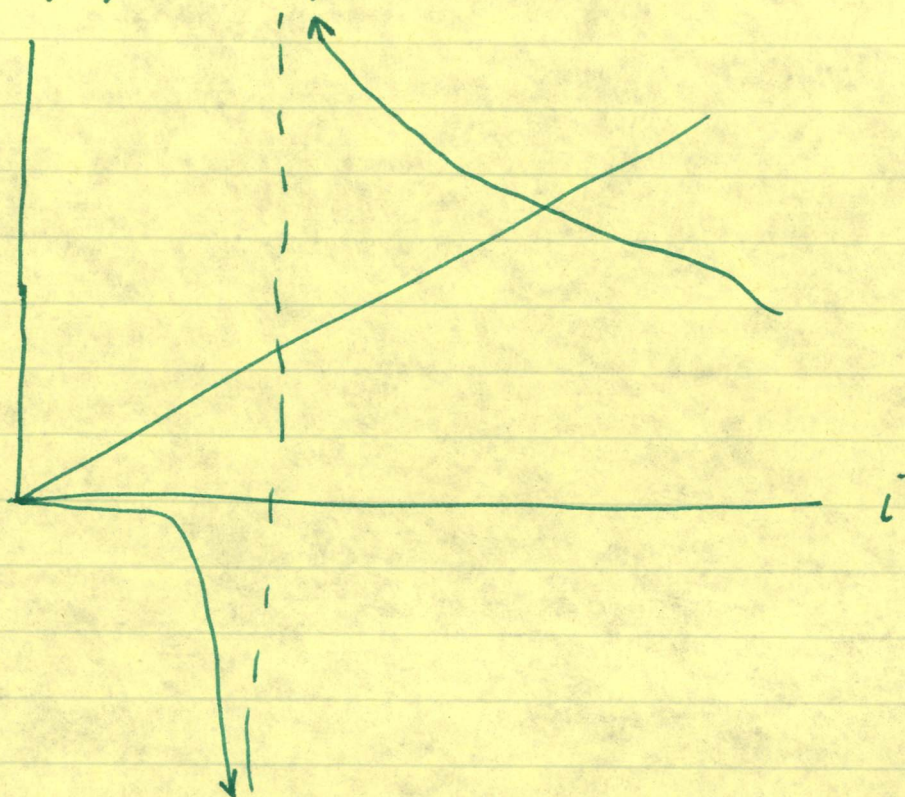
$$\text{If } R = P, \text{ rt. sd.} = \frac{a(1 - I^{-n})}{P(1 - I^{-n})} = \frac{a}{P}$$

regardless of i chosen.

~~if $R > P$~~

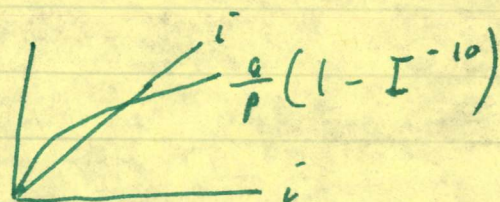


If $R > P$, denom. passes thru ~~0~~ zero
on way from neg. to + values.

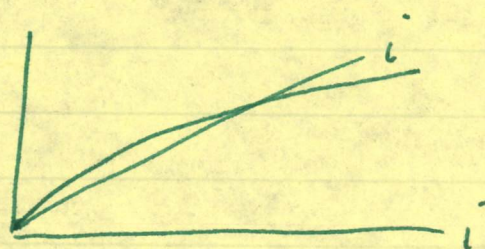


For class:

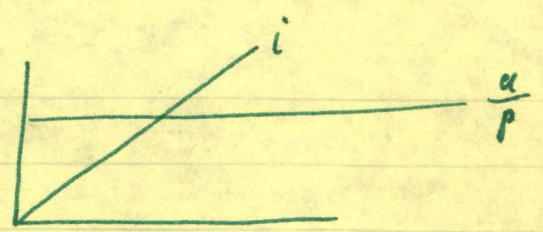
1. $R=0$ $i = \frac{a}{P} (1 - I^{-\eta})$



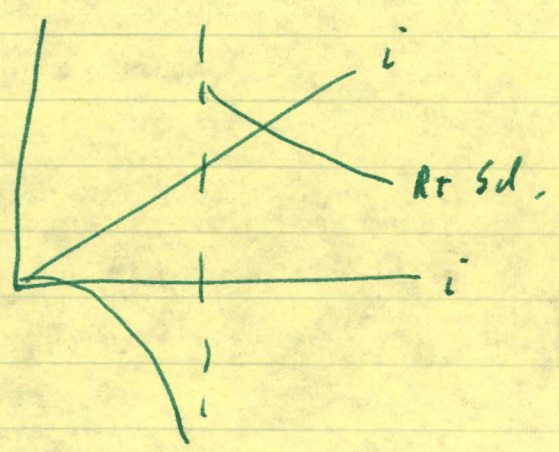
2. $R < P$ $i = \frac{a(1 - I^{-\eta})}{P - RI^{-\eta}}$



3. $R = P$ $i = \frac{a}{P}$



4. $R > P$



Note fallacy of saying there are 2 or more roots.
 0 doesn't count.
 ∞ " "

$$\left(1 + \frac{i}{f}\right)^{fn} = \left(1 + \frac{i}{if}\right)^{ifn} = \left(1 + \frac{1}{f}\right)^{ifn}$$

$$\lim_{f \rightarrow \infty} \left(1 + \frac{1}{f}\right)^f = e$$

Mon. 10th Wk.

0. IRR - what kind of qn. to expect on final on IRR: mult. choice.

1. a) Will do 8, Taxes & decisions. ^{or $i > .09$?} Apply tools.

b) Will be 2 qns on Final on 9 + 10.
Optional.

also a general opt. qn. of yr. own.

2. Why solve for n ? Payback time.

a) Volume of bus. you can do depends on payback.

$$Vol. = K \cdot T$$

$$T = \frac{1}{Pd.}$$

$$Vol = \frac{K}{Pd.} \quad Pd. \propto n$$

b) IRR $\propto T$. "Secret of Ronaldson Brown"

$$I^n = F$$

$$n = \frac{\ln F}{\ln I}$$

$$\ln I \approx i$$

$$i \approx \frac{\ln F}{n}$$

2

3. Naive payback time: $a n = P$

$$n = \frac{P}{a}$$

Naive ave. payback time:

$$n = \frac{1}{2} \frac{P}{a}$$

Your creditors will never buy this. Int. comes first (after rent). If you believe it, you will soon become insolvent.

IRS won't buy it either. It is income.

4. Other extreme, full salvage case.

Equilibrium, costs + prices adjust, offset advantages of full salvage.

Pd. is full n.

Land. Never a recovery of P. $n = \infty$

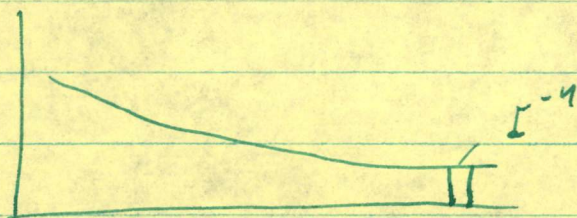
5. Common case: finite, but long life.

- O. Importance of getting P back. Int. comes first.
 A. Year One

$$\text{Int. is } P_i = a(1 - I^{-n})$$

$$\frac{\text{Int}}{a} = 1 - I^{-n}$$

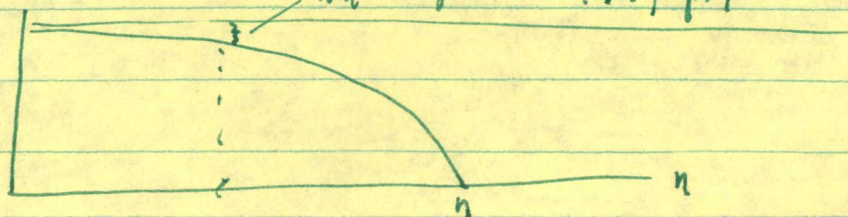
$$\frac{R}{a} = \frac{1 - \text{Int}}{a} = I^{-n}$$



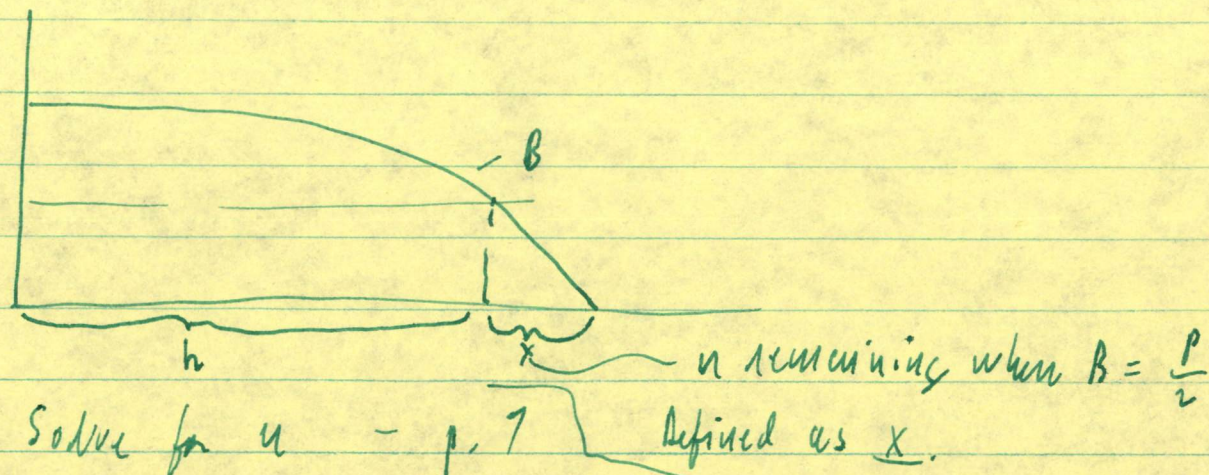
- B. Same in later yrs. So unpaid balance, B , off PV curve backwards. $1 + = PV$ of remaining prnts.



- C. Balance at $\frac{n}{2}$ yrs. is more than half.
 and repaid T. 1, p. 7



B. Half-life



$$\frac{h}{n} = \frac{n-x}{n} = 1 - \frac{x}{n} \quad \text{p. 8} \quad \tau 2$$