

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

1: Internal Rate of Return Calculator | IRR & NPV Calculator

An Internal Rate of Return Calculator (IRR) takes you to the bottom line of an investment by calculating an annualized rate of return. This calculator can calculate both the IRR and NPV on a complicated series of cash flows. It supports both irregular length periods and exact date data entry for the cash flows.

Looking at the numbers you posted as a table, I infer that you may be using time series analysis or similar exponential model to produce the cash flows. This means that it will require a higher interest rate to discount the cash flows in 3rd data set to bring their net present value to zero as there are less costs and more benefits. Now let us discuss IRR calculation, please note that an internal rate of return is the discount rate that sets an IRR equation to zero. To do this one must at first define this equation and there are a number of ways of doing this as explained here <http://> Now to solve one of these equations is a different story as there are no closed form formulas to solve these equations when number of cash flows exceed 5. At least I am not aware of any such formulas to find IRR when number of cash flows exceed 5. Finding solution for IRR using Cubic and Quartic formulas is possible but these formulas are quite complex and are beyond my comprehension. Now for cash flows whose count exceeds 5, I am not aware of any closed form formulas that find the IRR solutions. In such cases the underlying IRR equation has to be solved using iterative techniques or what are called numerical methods that find a single root one IRR. These iterative methods require an initial guess called a seed value that is used in repetitive calculations that are checked for convergence. If such iterative calculations converge we have found one of the IRR values. If such iterative calculations do not converge we halt the process and redo them by selecting a different guess rate as a seed value. This is one reason that Excel IRR function permits an optional guess rate. Over the years a large number of such iterative methods have been discovered some dated a couple of centuries ago such as the Newton-Raphson method named after the two mathematicians who independently discovered it namely Sir. Isaac Newton and Joseph Raphson. There are many other iterative methods besides the NR method that range in complexity and accuracy of the desired IRR solution. These iterative methods are suited for computers due to the large number of repetitive calculations that are required. Look it up on search engines and almost everyone else speaks of linear interpolation as the method of choice in finding the internal rate of return. As I stated, the iterative methods may find 1 or zero IRR solutions at a time however there exists some very complex computer algorithms based of numerical methods that find all possible IRR solutions both real and complex IRR solutions. Take the three set of cash flows that you have posted. There are 3 IRR values for each of your three sets of cash flows. So which one of the three IRR values best serves the purpose? To answer this question, you would have to look at the cash flows from the bare eyes to see what did we gain from it and one way to do so would be to either find the net worth of investment the sum of un-discounted cash flows which if found to be positive would mean we made money. If such a sum is found to be negative then we lost money. If such a sum is zero then we made nothing and lost nothing. To find the yield on investment, we take sum of benefits and divide it the sum of costs and then to find its Nth root minus one giving us the Yield. A negative yield will suggest a loss, a positive yield means gains and a zero yield means no return on investment was made or expected. As I stated in my first reply, the sum of your cash flows for 1st data set is positive whereas the sum of cash flows for both the 2nd and 3rd data sets is negative. Thus the yield on first investment is positive yet the yield is negative for the 2nd and 3rd data set.

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

2: Differential Equations - Complex Roots

As I stated, the iterative methods may find 1 or zero IRR solutions at a time however there exists some very complex computer algorithms based of numerical methods that find all possible IRR solutions (both real and complex IRR solutions).

Hera wakes up while breastfeeding and then realizes she is nursing an unknown baby: The English term Milky Way can be traced back to a story by Chaucer c. Most 18th to 19th Century astronomers considered them as either unresolved star clusters or anagalactic nebulae , and were just thought as a part of the Milky Way, but their true composition and natures remained a mystery. Observations using larger telescopes of a few nearby bright galaxies, like the Andromeda Galaxy , began resolving them into huge conglomerations of stars, but based simply on the apparent faintness and sheer population of stars, the true distances of these objects placed them well beyond the Milky Way. For this reason they were popularly called island universes, but this term quickly fell into disuse, as the word universe implied the entirety of existence. Instead, they became known simply as galaxies. Tens of thousands of galaxies have been catalogued, but only a few have well-established names, such as the Andromeda Galaxy , the Magellanic Clouds , the Whirlpool Galaxy , and the Sombrero Galaxy. All of the well-known galaxies appear in one or more of these catalogues but each time under a different number. Observation history The realization that we live in a galaxy which is one among many galaxies, parallels major discoveries that were made about the Milky Way and other nebulae. Milky Way Main article: In his view, the Milky Way is celestial. Actual proof of the Milky Way consisting of many stars came in when the Italian astronomer Galileo Galilei used a telescope to study the Milky Way and discovered that it is composed of a huge number of faint stars. The resulting disk of stars can be seen as a band on the sky from our perspective inside the disk. He produced a diagram of the shape of the galaxy with the Solar System close to the center. A different method by Harlow Shapley based on the cataloguing of globular clusters led to a radically different picture: The Magellanic Clouds , satellite galaxies of the Milky Way, appear near the left edge. Distinction from other nebulae A few galaxies outside the Milky Way are visible on a dark night to the unaided eye , including the Andromeda Galaxy , Large Magellanic Cloud and the Small Magellanic Cloud. In the 10th century, the Persian astronomer Al-Sufi made the earliest recorded identification of the Andromeda Galaxy, describing it as a "small cloud". These views "are remarkably close to the present-day views of the cosmos. Photograph of the "Great Andromeda Nebula" from , later identified as the Andromeda Galaxy Toward the end of the 18th century, Charles Messier compiled a catalog containing the brightest celestial objects having nebulous appearance. Subsequently, William Herschel assembled a catalog of 5, nebulae. Slipher discovered that the spiral nebulae have high Doppler shifts , indicating that they are moving at a rate exceeding the velocity of the stars he had measured. He found that the majority of these nebulae are moving away from us. Searching the photographic record, he found 11 more novae. Curtis noticed that these novae were, on average, 10 magnitudes fainter than those that occurred within our galaxy. He became a proponent of the so-called "island universes" hypothesis, which holds that spiral nebulae are actually independent galaxies. To support his claim that the Great Andromeda Nebula is an external galaxy, Curtis noted the appearance of dark lanes resembling the dust clouds in the Milky Way, as well as the significant Doppler shift. Wilson telescope, Edwin Hubble was able to resolve the outer parts of some spiral nebulae as collections of individual stars and identified some Cepheid variables , thus allowing him to estimate the distance to the nebulae: The distance is from the galactic core. In , Hendrik van de Hulst predicted that microwave radiation with wavelength of 21 cm would be detectable from interstellar atomic hydrogen gas; [47] and in it was observed. This radiation is not affected by dust absorption, and so its Doppler shift can be used to map the motion of the gas in our galaxy. These observations led to the hypothesis of a rotating bar structure in the center of our galaxy. In the s, Vera Rubin uncovered a discrepancy between observed galactic rotation speed and that predicted by the visible mass of stars and gas. Today, the galaxy rotation problem is thought to be explained

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

by the presence of large quantities of unseen dark matter. Among other things, Hubble data helped establish that the missing dark matter in our galaxy cannot solely consist of inherently faint and small stars. Particularly, galaxy surveys in the Zone of Avoidance the region of the sky blocked at visible-light wavelengths by the Milky Way have revealed a number of new galaxies. Galaxy morphological classification Types of galaxies according to the Hubble classification scheme: A slightly more extensive description of galaxy types based on their appearance is given by the Hubble sequence. Since the Hubble sequence is entirely based upon visual morphological type shape, it may miss certain important characteristics of galaxies such as star formation rate in starburst galaxies and activity in the cores of active galaxies. Elliptical galaxy The Hubble classification system rates elliptical galaxies on the basis of their ellipticity, ranging from E0, being nearly spherical, up to E7, which is highly elongated. These galaxies have an ellipsoidal profile, giving them an elliptical appearance regardless of the viewing angle. Their appearance shows little structure and they typically have relatively little interstellar matter. Consequently, these galaxies also have a low portion of open clusters and a reduced rate of new star formation. Instead they are dominated by generally older, more evolved stars that are orbiting the common center of gravity in random directions. The stars contain low abundances of heavy elements because star formation ceases after the initial burst. In this sense they have some similarity to the much smaller globular clusters. Many elliptical galaxies are believed to form due to the interaction of galaxies, resulting in a collision and merger. They can grow to enormous sizes compared to spiral galaxies, for example, and giant elliptical galaxies are often found near the core of large galaxy clusters. About one-tenth of elliptical galaxies have a shell-like structure, which has never been observed in spiral galaxies. The shell-like structures are thought to develop when a larger galaxy absorbs a smaller companion galaxy. As the two galaxy centers approach, the centers start to oscillate around a center point, the oscillation creates gravitational ripples forming the shells of stars, similar to ripples spreading on water. For example, galaxy NGC has over twenty shells. Though the stars and other visible material contained in such a galaxy lie mostly on a plane, the majority of mass in spiral galaxies exists in a roughly spherical halo of dark matter that extends beyond the visible component, as demonstrated by the universal rotation curve concept. Extending outward from the bulge are relatively bright arms. In the Hubble classification scheme, spiral galaxies are listed as type S, followed by a letter a, b, or c that indicates the degree of tightness of the spiral arms and the size of the central bulge. An Sa galaxy has tightly wound, poorly defined arms and possesses a relatively large core region. At the other extreme, an Sc galaxy has open, well-defined arms and a small core region. Like the stars, the spiral arms rotate around the center, but they do so with constant angular velocity. The spiral arms are thought to be areas of high-density matter, or "density waves". The velocity returns to normal after the stars depart on the other side of the arm. This effect is akin to a "wave" of slowdowns moving along a highway full of moving cars. The arms are visible because the high density facilitates star formation, and therefore they harbor many bright and young stars. Bars are thought to be temporary structures that can occur as a result of a density wave radiating outward from the core, or else due to a tidal interaction with another galaxy. With a mass of billion solar masses, they generate a significant amount of ultraviolet and mid-infrared light. They are thought to have an increased star formation rate around 30 times faster than the Milky Way. A ring galaxy has a ring-like structure of stars and interstellar medium surrounding a bare core. A ring galaxy is thought to occur when a smaller galaxy passes through the core of a spiral galaxy. These are categorized as Hubble type S0, and they possess ill-defined spiral arms with an elliptical halo of stars [76] barred lenticular galaxies receive Hubble classification SB0. Irregular galaxies are galaxies that can not be readily classified into an elliptical or spiral morphology. An Irr-I galaxy has some structure but does not align cleanly with the Hubble classification scheme. Irr-II galaxies do not possess any structure that resembles a Hubble classification, and may have been disrupted. An ultra diffuse galaxy UDG is an extremely-low-density galaxy. The lack of luminosity is because there is a lack of star-forming gas in the galaxy which results in old stellar populations. Dwarf galaxy Despite the prominence of large elliptical and spiral galaxies, most galaxies in the Universe are dwarf galaxies. These galaxies are relatively small when compared with other galactic formations, being about one hundredth the

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

size of the Milky Way, containing only a few billion stars. Since small dwarf ellipticals bear little resemblance to large ellipticals, they are often called dwarf spheroidal galaxies instead. A study of 27 Milky Way neighbors found that in all dwarf galaxies, the central mass is approximately 10 million solar masses, regardless of whether the galaxy has thousands or millions of stars. This has led to the suggestion that galaxies are largely formed by dark matter, and that the minimum size may indicate a form of warm dark matter incapable of gravitational coalescence on a smaller scale.

Interacting galaxy The Antennae Galaxies are undergoing a collision that will result in their eventual merger. Interactions between galaxies are relatively frequent, and they can play an important role in galactic evolution. Near misses between galaxies result in warping distortions due to tidal interactions, and may cause some exchange of gas and dust. The stars of interacting galaxies will usually not collide, but the gas and dust within the two forms will interact, sometimes triggering star formation. A collision can severely distort the shape of the galaxies, forming bars, rings or tail-like structures. In this case the relative momentum of the two galaxies is insufficient to allow the galaxies to pass through each other. Instead, they gradually merge to form a single, larger galaxy. Mergers can result in significant changes to morphology, as compared to the original galaxies. If one of the merging galaxies is much more massive than the other merging galaxy then the result is known as cannibalism. The more massive larger galaxy will remain relatively undisturbed by the merger, while the smaller galaxy is torn apart.

Starburst galaxy M82, a starburst galaxy that has ten times the star formation of a "normal" galaxy [83] Stars are created within galaxies from a reserve of cold gas that forms into giant molecular clouds. Some galaxies have been observed to form stars at an exceptional rate, which is known as a starburst. If they continue to do so, then they would consume their reserve of gas in a time span less than the lifespan of the galaxy. Hence starburst activity usually lasts for only about ten million years, a relatively brief period in the history of a galaxy. These outbursts trigger a chain reaction of star building that spreads throughout the gaseous region. Only when the available gas is nearly consumed or dispersed does the starburst activity end. The prototype example of such a starburst-forming interaction is M82, which experienced a close encounter with the larger M

Irregular galaxies often exhibit spaced knots of starburst activity.

Active galactic nucleus A jet of particles is being emitted from the core of the elliptical radio galaxy M A portion of the observable galaxies are classified as active galaxies if the galaxy contains an active galactic nucleus AGN. A significant portion of the total energy output from the galaxy is emitted by the active galactic nucleus, instead of the stars, dust and interstellar medium of the galaxy.

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

3: Internal Rate of Return (IRR), Uneven Cash Flows and Serial Payments

The equation is an simple example of an internal rate of return problem. Those are only the complex solutions to the equation f[r] Note that Relm is Listable.

Sometimes counseling is tied to specific instances of superior or substandard duty performance. For example, if you performed exceptionally well during an inspection, your squad leader might review your preparation for and conduct during the inspection. The key to successful counseling for specific performance is to conduct the counseling session as close to the time of the event as possible. It can occur in an informal setting. But it is important to have a record of some kind for reference later in a regular performance counseling. SSG Ulbrich, his squad leader, was impressed that he had squared his vehicle away so quickly. She called him over to his vehicle and in a few minutes they reviewed together the work he had accomplished to conduct PMCS and get it ready to go again. While she knew PFC Newman had worked through lunch, she also learned he had helped another soldier clean his personal gear in the barracks after duty hours. Leaders must counsel new team members when they report in. Reception and integration counseling serves two purposes: Reception and integration counseling starts the team building process. It clarifies your responsibilities and sends the message that the chain of command cares. Reception and integration counseling should begin immediately upon arrival so you can quickly become integrated into the organization. Commanders or their designated representatives must conduct promotion counseling for all specialists, corporals, and sergeants who are eligible for advancement without waiver, but are not recommended for promotion to the next higher grade. Army Regulation , Enlisted Promotions and Reductions, requires that AC soldiers within this category receive initial event-oriented counseling when they attain full eligibility and then periodic performance and personal growth counseling at least quarterly. After completion of the promotion point worksheet DA Form , SPC Snyder found out that he had only points-just enough to appear before the board. The minimum requirement to be placed on the SGT promotion list is points. SPC Snyder would need to get a maximum score on the board to obtain the additional points required for promotion to SGT. He received points from the board members. Although SSG Dills recommended SPC Snyder for promotion he would have to counsel him again because he did not have enough points to be added to the list. SPC Snyder helped develop the plan of action for ensuring he had enough points for promotion next time. You may receive counseling to help you get through the initial shock after receiving negative news, such as notification of the death of a loved one. Your leader will help you by listening and providing assistance as appropriate. That assistance may include help from a support activity or coordinating external agency support. Crisis counseling focuses on your immediate, short-term needs. Referral counseling helps soldiers work through a personal situation and may follow crisis counseling. Referral counseling also acts as preventative counseling before a situation becomes a problem. Usually, the leader assists the soldier in identifying the problem. Outside agencies can help your leaders help you resolve problems. Although it is generally in your best interest to seek help first from your immediate supervisor, leaders will always respect your right to contact these agencies on your own. But leaders, through experience, have developed a feel for what agency can help in a given situation and can refer you to the appropriate resource, such as Army community services, a chaplain, or a substance abuse counselor.

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

4: plotting - IRR Plot on Complex Plane - Mathematica Stack Exchange

I am trying to calculate a complex IRR on a potential project. Our group always decides based on IRR. This project has a large investment going in at two separate dates and pays out a portion of the profit and the investment roughly annually.

What is Jack to do? This is where the NPV calculation is useful. When the NPV is positive, that is the amount the investor can increase the initial investment by and still receive the desired ROR. I think users will find these enhancements useful: Create repeated cash flows easily. Work with hundreds of cash flows without manual entry. Creating entries with "Add Series" does not populate the existing dates with values or reset the existing values. It creates NEW entries. There is no longer a restriction to 96 inputs. Now prints all cash flows. Optionally removes zero entries so as not to print. When using the calendar, click on the month at the top to list the months, then, if needed, click on the year at the top to list years. Click to select a year, select a month and select a day. Naturally, you can scroll through the months and days too. Or you can click on "Today" to quickly select the current date. If you prefer not using a calendar, single click on a date or use the [Tab] key or [Shift][Tab] to select a date. Then, as mentioned, type 8 digits only - no need to type the date part separators. Also, because the date is selected, you do not need to clear the prior date before typing. And one more time: You have a computer. The investment can be made up of a series of cash flows. That is, there can be more than one investment or one withdrawal. However, there has to be at least one or each. The cash flows may occur on any date and for any amount. It is important to use the right sign positive or negative for each cash flow. How do you know what the correct sign is? Think of it this way. When you first invest, you have to write a check or transfer funds. Writing a check decreases your account balance. Therefore, enter all investment cash flows, including the "Initial Investment" as negative values. When you earn money back on your investment, you can deposit it into your checking account. The return increases your account balance. Therefore, enter all investment returns, including the final liquidation value of your investment, as positive values. The scheduled dates update every time you change the "Cash Flow Frequency". The calculator only uses the "Cash Flow Frequency" setting to create dates that most closely match your investment cash flows. If, in general, you only make additional investments or withdrawals twice a year, then set "Cash Flow Frequency" to "Semiannually" for example. Also, zero amount cash flows have no impact on the IRR result. You may set the frequency to "Monthly," and if there are only four cash flows in a given year, you just leave eight set to 0. You do not need to enter cash flows in date order. The calculator will sort them before calculating the result. This feature is handy, of course, if you realize that you missed entering a cash flow. Enter the amount in any available cell. Then change the date associated with that cell. Click "Calc" to sort. If you mistakenly duplicate a cash flow, simply set one of the duplicates to "0". This is not a bug. Changing "First Cash Flow Date" initializes a series starting on the date selected. Finally, a user can insert a series with a date before "First Cash Flow Date".

5: FM Chapter 6, Developmental Counseling and Professional Development

Finding Complex Solutions of Quadratic Equations Complete the table. many real solutions the equation $f(x) \in g(x)$ has for the given values of.

6: Solve quadratic equations: complex solutions (practice) | Khan Academy

complex solutions are usually ignored, an exception being Dorfman []. Like Dorfman [], this study uses all rates, real and complex, positive and negative.

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

7: IRR calculation - Microsoft Community

The Multiple IRR Problem A multiple IRR problem occurs when cash flows during the project lifetime is negative (i.e. the project operates at a loss or the company needs to contribute more capital).

8: 4 Ways to Insert Equations in Microsoft Word - wikiHow

Some examples of NPV and IRR If you don't have a fancy calculator we can solve the equation directly. Let n denote the length of the loan in months (3×12) and.

9: Advantages and Disadvantages of the NPV and IRR Methods

The IRR part requires some background, including definition of Net Present Value (NPV) and Internal Rate of Return (IRR). If a series of cash flows are made at regular intervals, the present value of those cash flows may be found by applying a discount to those occurring in the future.

6.10. NOTE ABOUT COMPLEX SOLUTIONS OF THE IRR EQUATION/T92

pdf

New International Dictionary of New Testament Theology 5.1 for Windows CH 9: LAW OF HARMONY 73 Advanced price action course Sozial Romantismus Episode of Carausius and Allectus Interpreting Canadas Past: Volume I The Student Teaching Experience The old Whig and modern Whig revived in the present divisions at court Political and social relationships In the backwash of war Gramophone Classical Good CD DVD Guide 2006 Understanding Christian spirituality Venture capital and junk bond financing 1114 Child Apprentices in America from Christs Hospital, London, 1617-1778 R.O.D, read or dream. Ultimate guide to accurate carb counting Smart Business Brazil (Smart Business Series) Field Programmable Logic and Application Proceedings of the 1997 Bipolar/Bicmos Circuits and Technology Meeting Mr. Kingsleys convertites Bisexual Politics Basic developmental mathematics Dawnland encounters Sexual Encounters With Extraterrestrials Economic arithmetic Barca the illustrated history of fc barcelona Basic drawing for engineering technology Mandatory disclosure, dispute resolution experts, and the dispute Woman and Freemasonry Johnson victor bridge engineering Mammals of Pennsylvania Lange otolaryngology 3rd edition Practical knowledge and direction of fit. Saint Croix notes Charles darwin theory of human evolution Students with severe disabilities Math makes sense 9 answers Aquarium fishes; their beauty, history, and care. Turn on the human calculator in you The Exciting Life of an Emigre