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by Jeffrey Pomerantz

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EDITOR'S NOTES

by Rich Junker

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APPS FOR ACTUARIES

by Kevin Pledge and Eddie Smith

The Technology Section is sponsoring a series of meeting sessions titled 'Apps for Actuaries'; the first of these took place at the Life and Annuity Symposium in New Orleans and is being repeated at the Health Meeting and Annual Meeting.

[full article]

IN PRAISE OF APPROXIMATIONS

by Carol Marler

When I was taking exams in the '70s, this article, Analysis of Approximate Valuation Methods, was one of my favorite readings. It was written in 1955, by E. Allen Arnold. I found it both interesting and practical. ...

[full article]

APPS, ACTUARIES AND OTHER TECHNOLOGY AT THE SEAC AND BEYOND

by Rich Junker

The June meeting of the Southeast Actuaries Conference in Naples, Fla., provided a golden opportunity to pilot a survey of actuaries' current uses of Social Media, programming languages and various technology tools. ...

[full article]

NUMBER PUZZLE SOLUTION

by Marc Whinston

Congratulations to the solver of the April issue puzzle! He is: Lee Michelson (Office of the Insurance Commissioner, Washington)

[full article]

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LETTER FROM THE CHAIR
by Jeff Pomerantz

Greetings! In this edition of my quarterly letter, I would like to highlight some of the key issues and hot topics for the Technology Section.

LinkedIn
As you may already be aware, we have a private LinkedIn group for section members. It is a great place to network and to share and gather information. LinkedIn provides an invaluable opportunity to keep abreast of the latest developments in technology as it continues to shape the future of our industry. There have been some interesting discussions out there on actuarial mobile apps, Microsoft Office 365, Technology Section webinars, and more. Currently, there are only 130 members in the group. That's only 12 percent of the Technology Section membership! I encourage you to join, check out the discussions, and participate (Linkedin.com).

Section Elections
Section council elections are just around the corner, and we have an excellent slate of prospective council members who have volunteered to be on the ballot and take a leadership role for the different sections. They will be introduced to you soon, as part of the SOA election process. We have five candidates running for the Technology Section Council: Andrew Chan, Joe Chou, Richard Junker, Albert Moore, and Larry Zhao. Please check out their bios when available and vote!

I would like to thank our five candidates for their interest in serving

SOA Staff
Meg Weber, Staff Partner

Sue Martz,
Section Specialist

Sam Phillips, Staff Editor

the Council and also thank all of our current council members and friends of the council who work hard to keep our section going! Volunteers are critical to advancement of the profession, so if you haven't volunteered to serve the profession in some capacity, please consider doing so. I know that I and others have found it to be very rewarding and beneficial on many levels.

Other Technology News
SOA Table Manager
In case you hadn't noticed, the SOA just made it easier for you to search for and retrieve one or more of the 900-plus mortality and other rate tables stored on the SOA website. You can link to them via the Resources section on the Technology Section home page or at http://mort.soa.org. With just a few clicks, the data in these tables will be available in your own personal XLS, CSV or XML file.

Also, a Table Manager software update is coming as well. Version 4.0 is under development and was expected to be released in June. Future maintenance of the tables' database will make use of the XtbML file format for each table, rather than the binary format used by the Table Manager software, versions 3.0 and prior.

Professional Development E-Learning Opportunities
Recently, I was navigating the Technology Section site to see what else might be interesting that people may not be aware of. I found a link to PD e-Learning opportunities from the Technology Section web page. Check it out!

Mobile Online SOA Directory
The SOA launched a new mobile interface to the Online Directory. Access it on your mobile phone at http://m.ActuarialDirectory.org

Life and Annuity Symposium
I am happy to report that we had two engaging technology sessions at the Life and Annuity Symposium in New Orleans in May—one on high performance computing and one on apps for actuaries (slides are available online). There were also two technology sessions at the Health meeting in June in Boston. Thanks to Bill Scheel, Adam DeConinck, Meg Weber, Kevin Pledge, Jason Flick, Tim Moberly and Jennifer Gillespie for speaking at these sessions.

On a related note, there will be a regular feature in future CompAct newsletters on apps for actuaries, so be on the lookout for that as well.

Southeast Actuaries Conference

Rich Junker, an active Technology Section member and CompAct co-editor, presented on technology topics at the Southeast Actuaries Conference on June 16. Thanks, Rich! As I mentioned before, volunteers are critical to our success.

Section Membership Value

Back in April, we had a meeting of Section Chairs in which we discussed membership value—what it means and how best to enhance it. Whether it's enhanced networking opportunities, better online resources, more communication (e.g., from the SOA), or something else, I am interested in hearing what the SOA, and the Technology Section specifically, can do for you to make your membership more meaningful. Please also consider getting involved as a volunteer as well. Please feel free to contact me directly at jeff.pomerantz@qrm.com or e-mail sections@soa.org and provide your feedback.

Please reach out to any of the council members listed inside the front cover of this newsletter with your ideas or to volunteer.

Thanks, and happy reading!

Jeff Pomerantz
2011 Section Council Chair

Jeff Pomerantz, FSA, CFA, MAAA, is an actuarial consultant at Quantitative Risk Management in Chicago and can be contacted at jeff.pomerantz@qrm.com.

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COMPACT EDITORIAL

by Rich Junker

It seems difficult to imagine, but a recent survey by the Society of Actuaries' Section Membership Value Team was directed to a significant number of actuaries who are not members of ANY Sections. More difficult to imagine, the most frequent reason cited was that they were not aware of the existence of the Sections! I believe that this lack of awareness is attributable not entirely to deficiencies in the SOA's promotional efforts, but also to actuaries who are not fully meeting their responsibilities as members of a professional organization.

I understand well the demands of work, family and community that tug at all of us, particularly during the child-rearing years. Yet the best security we can provide our family and community lies in keeping our professional skills and our bonds with fellow actuaries strong.

Francis Bacon spoke long ago to our responsibility to our profession. I've not heard it recited in recent literature as often as in the past: I hold every man a debtor to his profession, from which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereunto.

Speaking for myself, I have been episodically active as a volunteer through my career. Perhaps you, too, have been active in the past, and are considering how to identify an ideal new volunteer option. Maybe you are feeling stuck temporarily in the inertia of indecision. I

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suggest that writing for the Technology Section newsletter is an ideal way to make your reentry into service to your beloved profession.

The commitment is modest. A short article describing your joy in a simple Smartphone app qualifies as a valuable contribution. The benchmark of erudition is not at the level of a footnoted and integral-laden treatise à la the North American Journal!

Do give it thought, readers. And then begin to cascade your Technology Section leaders with your contributions!

In this issue
The subject apps for actuaries is a hot topic in the Technology Section right now. In "Apps for Actuaries," Kevin Pledge and Eddie Smith discuss several mobile apps that might be useful to you on the job. I also provide some interesting results from a technology survey I conducted at the Southeast Actuaries Conference meeting of June 15-17 in Naples, FL.

Rich Junker
Co-editor CompAct

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EXCEL FORMULA ROGUE'S GALLERY

by Mary Pat Campbell

Enough of showing people examples of good, better or best spreadsheet practices—let's wallow in the muck of the usual mess we have to untangle! (Some of which we have caused ourselves.)

With the help of the denizens of the Actuarial Outpost, I bring to you the inaugural edition of the Excel Rogue's Gallery—with special thanks (or groans) to Outpost users Gedankenexperiment, ADoubleDot, SpaceActuary, dumples, and Rake.

Let us start out with a relatively mild example:

EXAMPLE 1:

```
=VLOOKUP(R2,$A$2:$R$84,MATCH(S2,OFFSET($B$1:$F$1,MATCH
```

What's so bad about this?

Well, first, can you tell what this is supposed to be doing without sitting down and working it out explicitly? Would you know if it was screwing up? There are three different lookups being nested in each other, and one of the lookups isn't even looking for an exact match, and is assuming a particular ordering in the range that will be returned from the OFFSET function ... I hope that's all set up correctly.

Also, the "+ 6" at the end is a nice touch, don't you think?

One of the main problems with the above is having a nesting of functions that goes too deep for our brain to really be able to follow well.

EXAMPLE 2:

```
=SUM(INDEX(INDIRECT("'Projection!G"&$D22&":BG"&$D22
),1,MATCH(R$1,Projection!$G$9:$BG$9,0)):INDEX(INDIRECT
```

Then the author proposed his own fix to the above mess (after inserting an extra row with flags):

EXAMPLE 2':

```
=SUMIF(INDIRECT($A$1&"
Projection'!$G$8:$CG$8"),M$18,INDIRECT($A$1&"
Projection'!$G$"&$D23&":$cG$"&$D23))/M$20
```

Again, we have the generic obfuscation arising from multiply-nested functions, but I also want to put in a bit of warning against using INDIRECT if you can help it.

Consider how INDIRECT works: it takes as its argument a string that is a cell or range reference. Consider the two items—assume the value sitting in cell A1 is "B3" and the value sitting in cell B3 is 42.

Then:

=INDIRECT(A1)

Will result in 42 (it looks in cell A1, takes the string "B3" and hands it to INDIRECT, which then looks at the value sitting in cell B3).

The function call:

=INDIRECT("A1")

Will result in "B3".

Fine, nothing wrong with any of this. But what if you want to move the cells around? Say you cut-and-paste cell A1 into cell D4. The first function call =INDIRECT(A1) will get automatically updated to =INDIRECT(D4) (and will still return 42 ... as long as B3 hasn't gotten changed). The second function call, =INDIRECT("A1"), will

remain unchanged. There's nothing sitting in cell A1 after the cut-and-paste, so you will get an empty result.

Lesson: INDIRECT is dangerous in a spreadsheet where the structure may be actively changing.

Last example for this edition:

EXAMPLE 3:

```
{=SUM(($B5 = 'Loss Table'!$A$9:$A$8765) * ($Q5 =
'Loss Table'!$B$9:$B$8765) *
(IF(TRIM($K5)="","0",TEXT($K5,"0")) = 'Loss
Table'!$C$9:$C$8765) *
(IF(TRIM($L5)="","0",TEXT($L5,"0")) = 'Loss
Table'!$D$9:$D$8765) *
(IF(TRIM($M5)="","0",TEXT($M5,"0")) = 'Loss
Table'!$E$9:$E$8765) *
(IF(TRIM($N5)="","0",TEXT($N5,"0")) = 'Loss
Table'!$F$9:$F$8765) *
(IF(TRIM($O5)="","0",TEXT($O5,"0")) = 'Loss
Table'!$G$9:$G$8765) *
(IF(TRIM($P5)="","0",TEXT($P5,"0")) = 'Loss
Table'!$H$9:$H$8765) * ('Loss Table'!$I$9:$I$8765))}
```

Unfortunately, I can't get this to look as hideous as it looks in the Excel formula bar due to the way Microsoft Word auto-formats everything. But imagine this giganto-formula sitting there in a single line, difficult to read.

A word about the curly braces surrounding this, if you are unfamiliar with this, this is called an array function. I don't want to get into all the details at this moment, but the way one enters an array function is instead of hitting Enter when entering the formula, one hits CTRL-Shift-Enter.

Part of the reason I don't want to explain array formulas is that it's best not to use them if you can avoid it—most people don't understand them, and it can be difficult to edit if you have an array result (as opposed to an array formula sitting in a single cell).

Someone proposed a fix to the above, and I know I'm going to regret explaining one part because this will encourage the writing of megaformulas that I hate so much:

EXAMPLE 3':

```
=SUMPRODUCT(('Loss Table'!$I$9:$I$8765)
*($B5 = 'Loss Table'!$A$9:$A$8765)
*($Q5 = 'Loss Table'!$B$9:$B$8765)
*(IF(TRIM($K5)="","0",TEXT($K5,"0")) = 'Loss
Table'!$C$9:$C$8765)
*(IF(TRIM($L5)="","0",TEXT($L5,"0")) = 'Loss
Table'!$D$9:$D$8765)
*(IF(TRIM($M5)="","0",TEXT($M5,"0")) = 'Loss
Table'!$E$9:$E$8765)
*(IF(TRIM($N5)="","0",TEXT($N5,"0")) = 'Loss
Table'!$F$9:$F$8765)
*(IF(TRIM($O5)="","0",TEXT($O5,"0")) = 'Loss
Table'!$G$9:$G$8765)
*(IF(TRIM($P5)="","0",TEXT($P5,"0")) = 'Loss
Table'!$H$9:$H$8765))
```

In this case, the formula looked exactly like this, because when the author of this formula got to the end of each logical chunk, he typed Alt+Enter—which puts a carriage return in the formula. It makes the formula much easier to read, and has no effect on the calculation of the formula itself.

For future editions, please submit your own examples, or proposed cleanups to the formulas above, to marypat.campbell@gmail.com. I will credit submissions, but I also assure anonymity to those who don't want to be associated with car wrecks of bad formulas.

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THE MICROSOFT EXCEL OFFSET FUNCTION
by Damian A. Birnstihl

Many of us use Microsoft Excel on a daily basis. We have mastered the basics, such as VLOOKUP and SUMPRODUCT. We can create charts and professional looking documents. We may even have ventured into more advanced features, like pivot tables and macros. But there are a number of functions and features of Excel that despite their power are used infrequently. One example is the OFFSET function. Learning and applying this function can significantly improve your efficiency in creating and using spreadsheets.

The OFFSET function returns the value in the cell a specified number of rows and columns away from a specified starting point. The syntax is **OFFSET (reference, rows, cols**, height, width). The **reference** parameter is the starting point. Typically, it will be a single cell, but it can be a range of contiguous cells. The **rows** and **cols** parameters represent how many rows and columns away from the starting point you want to go. A positive value of the **rows** parameter means the target is below the reference cell, and a negative value means the target is above the reference cell. Similarly, a positive value of the **columns** parameter means the target is to the right of the reference call, and a negative value means the target is to the left of the reference cell. The height and width parameters are optional; if omitted, Excel assumes the same height and width as **reference**.

For example, OFFSET(B5,2,1) returns the value two rows below and one column to the right of the reference cell B5, or in other words,

the value in cell C7. OFFSET(B5,-2,-1) returns the value two rows above and one column to the left of cell B5, or in other words, the value in cell A3.

The real power of OFFSET is realized when it is used in conjunction with the ROW and COLUMN functions. The syntax of these functions is simple: ROW(reference) and COLUMN(reference). For example, ROW(F2) returns a value of two, and COLUMN(F2) returns a value of six. If the reference parameter is omitted, the ROW returns the value of the row in which the formula is typed, and likewise for COLUMN(). For example, typing =ROW() in cell A3 returns a value of three, and typing =COLUMN() in the same cell returns a value of one.

Now let's look at an example that combines the use of OFFSET and ROW. Suppose you have a spreadsheet containing the months of the year in cells A2:A13, as shown in Figure 1.

Figure 1

	A
1	**Month**
2	January
3	February
4	March
5	April
6	May
7	June
8	July
9	August
10	September
11	October
12	November
13	December

Now suppose you want to reverse the data so that December is at the top of the list and January is at the bottom, with the results to be shown in cells C2:C13. No need to re-type the data or cut and paste; one simple formula can do the trick. In cell C2 type the formula =OFFSET($A$13,2-ROW(),0). Then copy this formula to cells

C3:C13, and you have the desired result as shown in Figure 2.

Figure 2

	A	B	C
1	**Month**		
2	January		December
3	February		November
4	March		October
5	April		September
6	May		August
7	June		July
8	July		June
9	August		May
10	September		April
11	October		March
12	November		February
13	December		January

The key is figuring out how to set the parameters in the OFFSET function. This can be done using the following four-step process:

- First, determine what value you want in each target cell. In this example, we want cell C2 to have the value "December" from cell A13, C3 to have the value "November" from cell A12, etc.

- Second, choose a reference. This can be any cell on the spreadsheet, but a convenient choice is to use the cell in the original array that you want to appear in the first cell of the revised array. In this example that would be A13.

- Next, determine the offsets from this reference needed to produce the desired results. We stated above that we want C2 to contain the value from cell A13; this is zero rows below and zero columns to the right of the reference cell A13. In other words, C2 needs to evaluate to OFFSET($A$13,0,0). Similarly, we want C3 to contain the value from A12; this is one row above and zero columns to the right of the reference cell A13. In other words, C3 needs to evaluate to OFFSET($A$13,-1,0). Following the same logic, C4 must evaluate to OFFSET($A$13,-2,0). For cells C5:C13 the

emerging pattern holds: in each subsequent cell, the row offset decreases by one.

- Finally, look for a relationship between these offsets and the rows and columns of the cells in which the formulas will be entered, and translate the relationship into a formula. From step 3 we know that the row offset must be 0 in cell C2, -1 in cell C3, -2 in cell C4, etc. Notice that each row offset can be expressed as 2-ROW(). The column offset in this example is always zero. Thus, the desired formula is OFFSET($A$13,2-ROW(),0).

The process of determining the appropriate parameters becomes second nature with a little practice.

A word of caution is in order. The formula in the preceding example may no longer produce the desired results if rows are inserted into the spreadsheet. This can be seen by inserting a row at the top of the spreadsheet. Ideally, this action would not cause our results to change. In fact, inserting a row does indeed cause our resulting list to start at November instead of December. However, this can easily be avoided. In the example, we used a row offset of 2-ROW(). The fixed value two was appropriate before the row was inserted, but is not appropriate afterwards. So instead of a fixed value, we can reference the cell itself. If you're working the example on your computer, delete the row that you added, and in place of the original formula in cell C2, type in =OFFSET($A$13,ROW($C$2)-ROW(),0) and copy this formula to cells C3:C13. Now that the fixed reference has been replaced with a ROW reference, inserting rows at the top of the spreadsheet will not affect the results. Note that I have "anchored" both $A$13 and $C$2 using dollar signs.

Now, let's look at a similar example using OFFSET and COLUMN. Suppose you have the spreadsheet shown in Figure 3.

Figure 3

	A	B	C	D	E
1	Alpha	Bravo	Charlie	Delto	Echo

Our task is to reverse the list and put the results in cells A3:E3. In cell A3, type =OFFSET($E$1,0,COLUMN($A$3)-COLUMN()), and then copy this formula to cells B3:E3. This produces the desired result as shown in Figure 4.

Figure 4

	A	B	C	D	E
1	Alpha	Bravo	Charlie	Delto	Echo
2					
3	Echo	Delto	Charlie	Bravo	Alpha

Next, let's take the original list in Figure 3 and convert it from a 1x5 array into a 5x1 array, or in other words convert the row of data into a column with Alpha at the top and Echo at the bottom, and let's put the results in cells G1:G5. We'll use the four-step process introduced earlier to guide us:

- We want cell G1 to contain the value "Alpha" from cell A1, G2 to contain "Bravo" from B1, etc.

- We choose $A$1 as the reference since it contains the desired value in the first target cell, G1.

- G1 must evaluate to OFFSET($A$1,0,0), G2 must evaluate to OFFSET($A$1,0,1), G3 must evaluate to OFFSET($A$1,0,2), etc.

- We see that the row offset is always zero and that the column offset is the current row minus one. Thus, the formula to type into G1 and to copy to G2:G5 is =OFFSET($A$1,0,ROW()-ROW($G$1)).

Now that we've looked at some basic examples, let's look at some more advanced applications of OFFSET. Suppose we have the 3x5 array shown in Figure 5, and suppose that we want to transpose it to a 5x3 array and put the result in cells G1:I5.

Figure 5

	A	B	C	D	E
1	10	40	70	100	130
2	20	50	80	110	140
3	30	60	90	120	150

Using the four-step process:

- We want the first row of the original array to become the first column of the resulting array, and likewise for the second and third rows of the original array.

- A convenient choice for the reference is cell $A$1.

- G1 must evaluate to OFFSET($A$1,0,0). We want cell H1 to contain the value from cell A2, so H1 must evaluate to OFFSET($A$1,1,0). Similarly, we want cell G2 to contain the value from cell B1, so G2 must evaluate to OFFSET($A$1,0,1). If necessary, look at some additional cells until the pattern becomes evident.

- From the previous step, we note that the row offset relates to the column in the transposed array and that the column offset relates to the row in the transposed array. The formula is =OFFSET($A$1,COLUMN()-COLUMN($G$1),ROW()-ROW($G$1). Type this formula in cell G1 and then copy the formula to cells G1:I5 to obtain the desired result as shown in Figure 6.

Figure 6

	G	H	I
1	10	20	30
2	40	50	60
3	70	80	90
4	100	110	120
5	130	140	150

I hope that you are beginning to see the power of the OFFSET function. But it can do more than just flip arrays. For our final example, we will look at a practical example of how OFFSET can be used along with SUM. Consider the hypothetical claim triangle in Figure 7.

Figure 7

	A	B	C	D	E
1		July	August	September	October
2	July	10			
3	August	20	30		
4	September	40	50	60	
5	October	70	80	90	100

Here, each column represents an incurred month and each column represents a month of payment. Now suppose that we want to build

a table of cumulative paid claims by incurred month as shown in Figure 8. This table can be built with a single formula!

Figure 8

	G	H	I	J	K
1	**Incurred Month**	Lag 0	Lag 1	Lag 2	Lag 3
2	July	10	30	70	140
3	August	30	80	160	
4	September	60	150		
5	October	100			

For example, cell J3 represents claims incurred in August and paid through lag 2, i.e., October. The value is 30 + 50 + 80 = 160. Figure 9 shows the calculations necessary to produce the desired results. This is just an intermediate step that we will use as a guide to determine the appropriate OFFSET formula.

Figure 9

	G	H	I	J	K
1		Lag 0	Lag 1	Lag 2	Lag 3
2	July	=B2	=B2+B3	=B2+B3+B4	=B2+B3+B4+B5
3	Aug.	=C3	=C3+C4	=C3+C4+C5	
4	Sept.	=D4	=D4+D5		
5	Oct.	=E5			

So, in each case we want to sum starting at an offset, an equal number of rows and columns from cell B2, with both the row and column offset determined by the row within the array. Further, each summation is over an nx1 range, where n is determined by the column within the array. We also note that the lower right half of the array is blank because these represent payment months in the future. We can even make our formula account for this by using an IF statement. Here is the formula:

=IF(ROW()-ROW($H$2)+COLUMN()-COLUMN($H$2)>3,"",SUM(OFFSET ($B$2,ROW()-

ROW($H$2),ROW()-ROW($H$2),COLUMN()-COLUMN($H$2)+1,1)))

Typing this formula into cell H2 and copying it to cells H2:K5 produces the desired result. Note that this formula uses the optional height and width parameters in the OFFSET function. Let's evaluate the formula in cell J3 to see how it works. In J3 the formula is evaluated as follows:

=IF(3-2+10-8>3,"",SUM(OFFSET($B$2,3-2,3-2,10-8+1,1)))

=IF(3>3,"",SUM(OFFSET($B$2,1,1,3,1)))

=SUM(C3:C5)

=160

As you can see, the OFFSET function is both powerful and efficient for manipulating arrays of data. We have looked at several examples of how OFFSET can be used along with ROW, COLUMN, and SUM to reverse, transpose, and sum arrays with a single formula. Master the use of OFFSET and you may never have to cut and paste again!

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by Kevin Pledge and Eddie Smith

The Technology Section is sponsoring a series of meeting sessions titled 'Apps for Actuaries'; the first of these took place at the Life and Annuity Symposium in New Orleans and is being repeated at the Health Meeting and Annual Meeting. The session in New Orleans was so well received that we thought that a series of articles covering apps would be interesting to our members. Each article will review three or four apps that typically run on smart phones such as the iPhone, Android phones, Blackberry, and Windows 7 Phone, as well as the iPad and Android tablets. We may also cover Chrome OS; more about this in future articles.

Surprisingly, a show of hands at the New Orleans meeting showed that only half the attendees at that session had a smart phone or tablet device. Maybe these articles will show you the value in these devices if you don't yet have one. Another reason to consider these devices is that all future meetings will have Wi-Fi in the meeting rooms and there will be meeting apps—appropriately enough the first app we review will be the SOA Meeting App.

SOA Meeting App (Kevin)
The specific meeting app we are reviewing is for the 2011 Health Meeting. Future large SOA meetings will have similar apps. I tried both the iPhone and iPad versions, and they both worked smoothly. There is also an Android version and a Blackberry version, however there is not yet a version for Windows Phone 7. The app allows you to browse the event program, build your personal schedule, take notes, access handouts, and rate sessions and speakers. The

transition from the event schedule, to the map or to session slides is seamless. You can also tweet from the application, including tweeting the presentation slides. No doubt, not everyone will be a fan of opening up the meeting to this technology, but I believe it is the way forward. If you'd like to see a video of its cool features, you can check it out at: Vimeo.com/21581588. Congratulations to Kerri Leo and the team at the SOA behind this.

Twitter Apps (Kevin)

I mentioned Twitter in relation to the meeting app; you should also consider a dedicated Twitter app. Before saying what apps I prefer I should say something about Twitter for those of you who have not tried it. You probably already know that Twitter is for sending short messages of 140 characters or less and are wondering what you would do with that. While some people may believe that the world wants to know what they had for lunch and how they feel after the gym, in business Twitter is great for sending links to articles and short comments, especially at meetings. Twitter is further enhanced by lists, this allows you to group people and topics. On the desktop I prefer TweetDeck, which is also available for Chrome, however the mobile version of this is not my first choice.

Eddie Smith prefers Tweetbot ($1.99 iPhone) because of the list functionality. I tend to use the native Twitter app (free iPhone, Android, Blackberry, Win7) for reading, but I prefer HootSuite (free iPhone, Android) for writing as it has the link abbreviations (necessary when you are limited to 140 characters). Seesmic (free iPhone, Android, Blackberry, Win7) is also worth a look, but it includes ads which I find distracting on a mobile device where the screen is already quite small.

GoodReader (Eddie)

Virtually all business professionals—actuaries included—need to look at .pdf files on the go. Most iPhone and iPad users agree that GoodReader is the best app for reading, annotating and managing PDF files when away from their desktop computer or laptop. GoodReader can connect to several different types of remote servers making it easy to retrieve and even sync files. In other words, suppose you mark up a .pdf on your iPad: Those changes will be available back on your desktop computer if you connect to a common server. GoodReader also works with Word files, image files, and many other formats making it the de facto file system of the iPhone and iPad.

iThoughtsHD (Eddie)

iThoughtsHD is a very well-designed mind mapping app. It's

available on both the iPhone and iPad. Mind maps can be very useful for brainstorming projects, managing projects and taking meeting notes. One of iThoughtsHD's most compelling features is its ability to connect to and sync with different types of remote servers. It also supports a variety of different mind map formats making it compatible with almost every desktop mind mapping application on the market today.

Please let us know if there are any apps you recommend or any apps that you feel we should be covering.

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IN PRAISE OF APPROXIMATIONS

by Carol Marler

When I was taking exams in the '70s, this article, Analysis of Approximate Valuation Methods, was one of my favorite readings. It was written in 1955, by E. Allen Arnold. I found it both interesting and practical. It began, "Since Frank Shailer's paper 'Approximate Methods of Valuation' appeared in 1924, our actuarial literature has omitted any further development of this subject, except for occasional discussions." Not long after I took that exam, the syllabus was changed and the article was removed. Nothing comparable has replaced it. One purpose of this article is to begin some further discussions of when, how and why we need approximations.

Of course the environment has changed a lot over the years. Our personal computers have power exceeding many mainframes of earlier times. In fact, it has been said that with the computer power available today, approximations are no longer necessary. I disagree. The benefits of increasing computer power have led to significant changes in the way we do our work. Organizational structures are flatter. We no longer have an army of clerks to do routine calculations, and typing pools are an anachronism. We must produce results in compressed time frames, and more analysis is expected. The products we offer have become much more varied, more complex and more individualized, while our valuation methods are also growing more complex, reflecting a range of values rather than a single number result.

Before presenting my arguments for using approximations, it seems worthwhile to define a few terms and to provide some distinctions.

- Estimate/Approximation

  - An estimate is an educated guess. My dictionary says, "Estimate ... implies a personal judgment" in a specific context.

  - An approximation is a methodology for getting close enough. Generally this involves a model or formula.

- Accuracy/Precision

  - Accuracy is a measure of how close one is to the correct answer.

  - Precision relates to the possible range of results—more significant digits indicate higher precision.

Here are four reasons why approximations are still a very important part of actuarial work.

First, I believe that most companies have at least one block of business that never grew big enough to justify making system modifications to handle all its unique features. An old term for this category is "shoe box" because all the administrative data was once kept in a box about the size of a shoe box. Even though these cases are probably administered on a computer now, the actuarial analysis is, of necessity, simplified in order to focus on other issues that are more material.

Cost/benefit analysis is always necessary. Good practice calls for putting in the amount of time commensurate with the accuracy that can be added. Experienced actuaries are able to recognize when a judgment call is better than another computer run.

Second, there are a lot of approximations used even in calculations often considered to be "exact." For example, there are two ways to express a person's age as an integer, and both methods are well accepted—age last birthday or age nearest birthday. Unless the calculation is actually done on the person's birthday, though, the integer age is only an approximation. Likewise the use of mean reserves or mid-terminal reserves is well-established. Some companies prefer to use interpolated terminal reserves, but even this is generally done only to the nearest month.

We use a lot of input assumptions that are only approximations. Our mortality tables may look exact, but they always involve some degree of smoothing. Interpolation and/or extrapolation are also necessary because of the sparseness of data, especially at the

oldest and youngest ages.

Many companies use early cut-off for administrative systems in order to meet deadlines. Any adjustment to the actual month end-date is a form of approximation. There is often a trade-off between timeliness and accuracy, or a trade-off between the size of the potential error and the cost to make the results more accurate.

Third, the growing use of stochastic models has made it abundantly clear that all our actuarial calculations are merely a point estimate taken from a random distribution. The fact is, we know that the expected value we calculate is almost certain to be wrong, although the law of large numbers does tell us that we can get close enough. How close? A lot of work has gone into analysis of the error involved in various mathematical functions, particularly when these functions are included in a software package. Actuarial judgment is again the correct answer.

On the other side of the closeness question, consider a pension plan with only about five participants. Assuming pre-retirement mortality using any standard table will in most years result in a fractional short-fall in results because actual gains from mortality are less than expected. For this reason, it is common practice to assume zero pre-retirement deaths in small plans.

Fourth, when the underlying data is missing, inaccurate or otherwise flawed, a good enough calculation is really the most efficient choice. Various terms have been used to describe overexertion in such a situation: False precision, spurious precision or illusionary accuracy.

I once heard of an actuary who claimed that he got more accurate results when he ran his model with quarterly payment patterns. The problem was that he hadn't measured actual quarterly premium collections, but simply divided the annual premiums by four. Spurious precision. And because the input data was of low quality, illusionary accuracy.

Another story involves an actuary who presented a rounded result to his manager: about X thousand dollars. The manager wanted it more accurate, so the actuary went back to the computer output and gave an answer to the dollar. When the manager was still dissatisfied, the actuary pulled some change out of his pocket, counted it, and offered that result to provide dollars and cents. False precision. I wasn't there, but I do hope the manager laughed.

There are other times when approximations are valuable.

Checking for reasonableness: This might be for a complex calculation, such as scenario testing. An approximate calculation could show if the results are unreasonable, and may give some insight into where the problem might be.

Stochastic on stochastic: By this phrase, I refer to those cases where each year of each scenario requires an embedded stochastic model. This is a concern with regard to Embedded Value calculations, since one of the items to be projected is the required surplus, which is defined in terms of a conditional tail expectation (CTE), or in other words a stochastic calculation. The number of calculations is a linear function of the square of the product of the number of scenarios and the number of years projected. There are several methods for reducing the computational intensity. One of the most obvious is to replace the CTE with some approximate formula that does not require stochastic projections. Then the formula for time required becomes linear rather than quadratic.

Finally, some comments about incurred but not reported (IBNR) claim liabilities. Whatever you do for this liability, there will be some volatility that cannot be removed. In other words, nothing will estimate it well. It can be helpful to remember that the objective is to estimate the eventual incurred claims, not the IBNR itself. Thus the error measurement ought to be with respect to the total current estimate of incurred claims.

Of course, you might be in the situation of a company president whose company had only recently begun writing life insurance. With just a few hundred policy holders, the president confidently explained, "I know all of our insured people and they haven't died." Sooner or later, though, there would be a situation in which, through sheer numbers, some death might not be noted in time. A consulting actuary was able to convince the president that he needed to establish a formula-based IBNR while it was small and then allow the provision to grow slowly over the years.

CONSIDERATIONS

Sometimes approximations are necessary, when no better alternative method exists. This is commonly the case when dealing with claim liabilities, including IBNR, as noted above.

Materiality is an important issue. For example, if the aggregate value of approximated item is small, a more complex or detailed approach is not justified. The goal should be substantial accuracy, or in other words, a minimum reasonable error. The method should also be unbiased, or at least have an acceptably small bias. Calculations

that can be easily checked are always preferable. Caution should be used when results from one approximate method are used as input to other approximations, to avoid any compounding of errors—the snowball effect. Variations from period to period must also be considered. If a result is too large one time and too small the next, the distortion can have a bad effect on resulting earnings and/or surplus.

Saving time is helpful in meeting deadlines; however, sometimes an approximate method will result in a loss of additional information that was provided by a more detailed approach. This is another trade-off that must be taken into account.

Other issues that must be considered include appropriate utilization of technical personnel, acceptability to auditors if GAAP or to state insurance examiners for statutory, and the value of simplicity. The cost should not be disproportionate to the importance of a particular item.

Mr. Arnold ended his paper with this sentence, "Modern business conditions virtually require that the actuary be continually alert to the opportunities for the extension and improvement of approximate methods of valuation." I think this statement is as true today as it was when he wrote it more than 50 years ago.

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APPS, ACTUARIES AND OTHER TECHNOLOGY AT THE SEAC AND BEYOND

by Rich Junker

The June meeting of the Southeast Actuaries Conference in Naples, Fla., provided a golden opportunity to pilot a survey of actuaries' current uses of Social Media, programming languages and various technology tools. Given that I was speaking on the subject of Smartphone applications for actuaries and promoting the Technology Section to this actuarial club, a survey of what actuaries use these days was a natural.

The survey count came to around 110 completed submissions and multiple responses were common. Several interesting observations emerge:

- Nearly half of all responding still use a basic cell phone and nothing more.

- Of smartphone users, nearly half use BlackBerries (many corporate-provided), 30 percent or so iPhones (some home phones), about 20 percent use Android phones, almost no one uses Windows phones.

- MS Office 97-2003 still has 25 percent adherents, Office 2007 has a 50 percent share, Office 2010 25 percent plus.

- Among programming languages, MS Visual Basic predominates, with SQL a strong second, and all others falling in single digits, notably R, SAS, C+ and the venerable though once-venerated APL.

- Tablet PC use is scarce for this group: 14 iPads and only one Android Tablet.

- As expected, Windows continues to predominate over the Mac/Apple OS, at eight to one or so.

- Among social media, LinkedIn leads the pack, with Facebook a strong second, while Instant Messaging remains extremely popular.

- Astonishing to me, only one respondent cited himself a Twitter user. I have a percolating notion that actuaries and senior executive types look at Twitter askance because they treasure their gravitas, and prefer to intone and declaim and propound, rather than to tweet or twitter or twerp or chirp. Something like the days when executives balked at adopting computers because they abhorred the indignity of displaying their index finger pecking skill to subordinates and superordinates.

Looking Beyond the SEAC

The vision of the future for actuarial meetings is to provide presentations electronically. With the new Meeting App (check it out if you have not been to an SOA meeting lately, at Vimeo.com/21581588). Users will be able to register, annotate presentations, tweet to colleagues, find the next meeting room and more, all from their smartphones and tablet PCs. Look for it, download it to your smartphone, for the upcoming Valuation Actuary Symposium and the Annual Meeting. (You don't have to be registered for the meeting to access the app.)

The Meeting App is a wonderful advance for actuarial meetings, but it has not achieved its ripe destiny yet, by my observation at this meeting. As for SOA-hosted meetings, the speakers' presentations at the SEAC were all available online for members to print or to view electronically. Yet for every session, I saw almost no one with a laptop or tablet at hand to view the presentations and mark them up. Only a few had taken prints for note-taking, despite the convenient business center just across the hall. I think many of us miss the three-slides per page prints for note-taking, to maximize the learning from the presentations.

My fond hope is that several readers will write immediately to CompAct to unveil the heresy of my thought.

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ARTICLES NEEDED FOR COMPACT NEWSLETTER

Your help and participation are needed: Articles, book reviews and other information on technology useful to actuaries are needed! All articles will include a byline to give you full credit for your effort. An annual prize is awarded for the best article of the year. If you would like to submit or discuss an idea for an article, please contact Richard Junker or J. Eddie Smith.

Submissions for future editions are also welcome!
Submission deadline is August 4 for the October issue.

Thank you for your ideas!

J. Eddie Smith can be reached at j.eddie.smith.iv@gmail.com.

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