

PolyMath Software Report

by

Michael B. Cutlip, University of Connecticut
Mordecai Shacham, Ben-Gurion University of the Negev, Israel

The year of 2014 will be very important and active for PolyMath Software. In addition to the two new products that are discussed below, PolyMath Software will be celebrating its 30th Anniversary as a PC product since it was introduced at the San Francisco AIChE Meeting as a product in 1984. The CACHE Educational Site License for PolyMath Software will enter its 25th year as a CACHE product. These milestones will be celebrated at the Annual AIChE Meeting this year in Atlanta. This year will bring a new version 7 with many enhancements and a completely new product named PolyMathLite that runs on Android devices. More details on these products are given in this report.

PolyMathLite

PolyMathLite has been programmed for the Android OS and can be executed on Android phones, tablets and computers that have the Android 2.2 or above. The current Android OS is 4.3 so PolyMathLite can execute on most Android devices.

PolyMathLite is a numerical problem solver that executes completely on the Android device. This software uses the same algorithms and logic that have been used for many years in the PolyMath package.

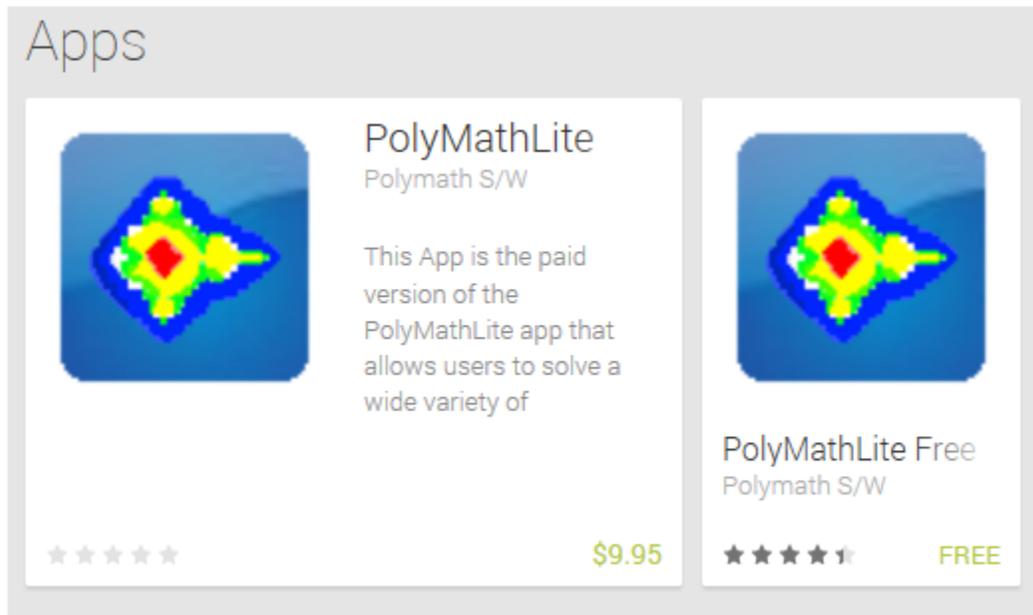
PolyMathLite solves the following types of problems:

1. Systems of Explicit Equations
2. Systems of Linear Equations
3. Systems of Nonlinear Equations
4. Systems of Differential Equations
5. Regressions including Linear, Multiple Linear, Polynomial and Nonlinear

The actual code for PolyMathLite problems is basically the same as is utilized in PolyMath with only minor changes are required in Linear Equations and Regressions. PolyMath code can just be copied into PolyMathLite and it will execute with the same algorithm selection and accuracy. This new product has a dedicated website that contains more information:

<http://www.polymathlite.com/>

There are two version of PolyMathLite available from the Google Play store:



The free version is the complete package, but it can only solve a very small number of problems while the paid version (\$9.95) is limited only by the device storage and CPU. More details including an introductory video are available on GooglePlay by searching on 'PolyMathLite'.

<https://play.google.com/store/search?q=polymathlite>

One of many interesting features is the automatic creation of a MATLAB m-file for the problem during the execution of PolyMathLite. This generated m-file can be sent to a computer with MATLAB, copied into the MATLAB editor, and it will execute the problem. Another attribute is that all problem activities from entry to solution are done on the Android device without need to be on the Internet or connected to the cloud. This could be very helpful to users, particularly in developing countries. It is also hoped that students, faculty and professionals in STEM fields (Science, Technology, Engineering, and Math) can begin to use numerical problem solving starting with PolyMathLite and then utilizing PolyMath for the PC.

A paper given at the AIChE Annual Meeting in 2013 titled "The Role of Smartphones and Tablets in Numerical Problem Solving" gives more information and is reproduced in this CACHE Newsletter.

Polymath 7

A new version of PolyMath will be also introduced in 2014. This is expected to be in the third quarter of this year, and this version will become available to the CACHE Educational Site License users and to individual purchasers. This new version is programmed completely in .NET 4.0, and the numerical algorithms have been verified and are working quite well. The general changes that will be seen in this new version include the following and a few surprises:

1. Linear Programming – New Simplex Solver
2. Nonlinear Equations – Automated Creation of complete MATLAB m-files
3. Differential Equations – Output Options, Creation of MATLAB m-file, Tabular Outputs at Desired Intervals, Export to Excel with ODE Solver Add-In
4. Simulation with Parameter Estimation in Dynamical Systems Modeled by ODEs
5. DIPPR Database Interface for Constant and Variable Properties with output to Polymath, MATLAB and Excel

This new version will be described in more detail nearer to release date on this CACHE website and on the PolyMath website:

<http://www.polymath-software.com/>