ExerciseCosineTwo: Introduction

The **linear** model in **ExerciseCosineOne** is

$$g(t) = M + B\cos t + C\sin t,$$

where $\bar{\beta} = [M, B, C]$ are the free parameters having errors $\sigma_{\bar{\beta}} = [\sigma_M, \sigma_B, \sigma_C]$. The argument units are $[t]$ = radians. In that **ExerciseCosineOne**, you are asked to derive the following **analytical equations (i.e. exact solutions).**

(a) The peak to peak amplitude A of this model is the difference between the maximum value $g_{\max}$ of $g(t)$ and the minimum value $g_{\min}$ of $g(t)$. Solve $A \pm \sigma_A$ from the given known $B \pm \sigma_B$ and $C \pm \sigma_C$ values.

(b) The primary minimum $t_{\min}$ of this model fulfils $g(t_{\min}) = g_{\min}$.
Solve $t_{\min} \pm \sigma_{t_{\min}}$ from the given known $B \pm \sigma_B$ and $C \pm \sigma_C$ values.

Your A, σ_A, $t_{\min}$ and $\sigma_{t_{\min}}$ solutions can contain **only** parameters B, σ_B, C and σ_C.

ExerciseCosineTwo: Problem

Use free parameter values M = **M=1**, B = **B=1**, C = **C=1**, σ_B =**eB=0.1** and σ_c =**eC=0.1**. Assume Gaussian B and C distributions, where the standard deviations are σ_B and σ_c.

Edit your **python** program **ExerciseCosineTwo.py**, which solves and prints **numerical** A, σ_A, $t_{\min}$ and $\sigma_{t_{\min}}$ estimates.

Send your **ExerciseCosineTwo.py** program to the assistant

Tip 1. In your model simulations, use 10000 time point values t_i =**T** between 0 and 2π.
Tip 2. Your program should give about the same results as those printed below

```
('Results from ', 1000, 'simulated data samples are')
('A=', 2.8311890906257715)
('A error =', 0.19988739465989339)
('tmin=', 3.9286225602115157)
('tmin error=', 0.070263545677305833)
```