Technische Universität München **Chair of Automatic Control Engineering** Dr.-Ing. Marion Leibold **Chair of Information-Oriented Control** Dr.-Ing. Stefan Sosnowski	**Robot Control Laboratory** Information

Excercise Information

a) Excercises without a gray box are not mandatory. However, these excercises can indicate solutions and can be used to test your implementations. Furthermore these questions could be used in the oral examination.

b) Gray boxes indicate that this implementation has to be handed in.

(4)	${}_a\boldsymbol{p} = \text{cal\_ap}({}_b\boldsymbol{p})$	MAT
Input:	${}_b\boldsymbol{p}$ 3×1 Vector	
Output:	${}_a\boldsymbol{p}$ 3×1 Vector	
Allowed routines:	rotx(), roty(), rotz(), transl()	

The number in brackets on the top left shows the number of points for this implementation. The headline shows you how the function should look like. Please make sure that the name and input/output parameters are exactly the same. Submissions that violate that rule will be given zero points. The MAT/SIM in the top right corner indicates you if a matlab function or a simulink file is expected. Input and Output define exactly how these two parameters have to look like. The allowed routines show you the routines from the Robotcs Toolbox that you are allowed to use. Please note that routines from any other Matlab toolbox are strictly forbidden to use.

Blue boxes give you hints how to test your implementations.

Test: Compute the transformation matrix ${}^a\boldsymbol{T}_{b2}$ using the RPY angles Ω_1 from d) and the translational vector from a1) with your function. Additionally compute ${}^a\boldsymbol{T}_{b3}$ using the routine $\mathbf{rpy2tr()}$. Compare ${}^a\boldsymbol{T}_{b2}$, ${}^a\boldsymbol{T}_{b3}$ with ${}^a\boldsymbol{T}_b$.

Submission

Submission is always due two weeks after publication of the assignment. Late submissions will effect in zero points for the assignment. The submission will be made over moodle, where you will upload your submission in a zip-file. This file has to contain all of your implementations and the code, which is necessary for your implementations to run. Moreover the file *personal.m*, which contains your personal data, has to be part of your submission. The *personal.m* file will be available on moodle.

Robotics Toolbox

We will use version nine of the *Robotics Toolbox*. This toolbox can be downloaded from `http://www.petercorke.com/Robotics_Toolbox.html`. Please download the latest version. To use the toolbox, you have to unzip it and subsequently add the directory of the unzipped folder to your Matlab path. You can do so by either using the command *addpath* or use the setpath button in the Matlab home directory. Please make sure that you add the folder and its subfolders to your path. If you have any problems with the setup, you will get help in the tutorial.