GUISDAP Documentation

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1. Data file format

A datafile contains the parameter block, correlator status word and correlator dump from one integration period. They are stored in binary Matlab files as three variables:

`d_parbl`	parameter block, column vector
`d_status`	correlator status word
`d_data`	correlator dump, column vector

The name of the data file gives the dump time in seconds from the beginning of year. The name must always be 8 character long and is padded with zeroes from the left, when necessary. Thus a measurement on the New Years Day at 1 UT is written to a file with name `00003600.mat`. The name convention is chosen so that the same names are usable in various systems for which Matlab is avaible (MAC, UNIX, MS-DOS and Vax VMS). Of these the most restrictive is MS-DOS. For safety reasons the extension part is always assumed to be `.mat`.

2. Result file format

The analysis result file contains the parameters with errors and the necessary control information so that the post prosessing of results is possible. The file is a binary Matlab file and the names of the variables are started with the prefix `r_`. In the following the parameters appear in the order $N_e, T_i, T_e/T_i, \nu_{in}, v_i$ and are denoted by $p_1 \ldots p_5$.

variable	size	contents
`r_ver`	(1,1)	version number of the GUISDAP program
`name_expr`	(1,1)	Name of the experiment
`name_site`	(1,1)	measurement site
`r_time`	(2,6)	start and end times of the integration period in order: year, month, day, hour, minutes, seconds
`r_az`	(1,1)	antenna azimuth (from parameter block)
`r_el`	(1,1)	antenna elevation (from parameter block)
`r_Pt`	(1,1)	power of the transmitter (from parameter block)
`r_m0`	(1,2)	masses of ions in the fit in atom mass units
`r_range`	(Ng,1)	range in km to the scattering volume
`r_h`	(Ng,1)	altitude in km of the scattering volume
`r_param`	(Ng,5)	result of the fit, $p_1 \ldots p_5$
`r_error`	(Ng,15)	errors and correlations of the parameters, order: $\Delta p_1 \ldots \Delta p_5$, Corr$(p_1, p_2)$, Corr$(p_2, p_3)$, Corr$(p_3, p_4)$, Corr$(p_4, p_5)$, Corr$(p_1, p_3) \ldots$Corr$(p_4, p_5)$
`r_res`	(Ng,2)	residual of the fit with standard deviation
`r_status`	(Ng,1)	status of the fit, values: 0 = fit OK 1 = max number of iterations exceeded 2 = No fit done, because data too noisy
`r_dp`	(Ng,1)	ion composition $[O^+]/N_e$
`r_apriori`	(Ng,5)	*a priori* values for $p_1 \ldots p_5$
`r_apriorierror`	(Ng,5)	*a priori* errors for $p_1 \ldots p_5$
`r_pp`	(Npp,1)	Power profile with $T_e/T_i = 1$ and neglecting Debye term
`r_pprange`	(Npp,1)	Range to power profile points
`r_XMITloc`	(1,3)	transmitter location [latitude (°N), longitude (°E), altitude (km)]
`r_RECloc`	(1,3)	receiver location [latitude (°N), longitude (°E), altitude (km)]
`r_SCangle`	(1,1)	half of the scattering angle (radians)