UBV - Johnson and Morgan - 1953

General purpose system. Due to problems in the reconstruction of the original system, two versions have become popular: the USA [198] and the Vilnius [15].

GENERAL INFORMATION

AUTHORS	H. L. Johnson and W. W. Morgan
TELESCOPE	0.33m and 2.08m (reflectors) Mc Donald Observatory
DETECTOR	RCA 1P21 (about refrigeration see [149])
MAIN ARTICLE	Johnson H.L., Morgan W.W. 1953, ApJ 117, 313

SYSTEM DESCRIPTION

BANDS DESCRIPTION [178], pg. 50						FLUX CALIB. (#)
band	filter	alternative	λ_0 (Å)	λ_{eff} (Å) (#)	*WHM* (Å)	λ_c (Å)	(erg cm^{-2} sec^{-1} Å^{-1})
photoelectric USA							
U	Corning 9863	2mm UG2	3600		700	3500	3.98 10^{-9}
B	Corning 5030 + 2mm GG13	1mm BG12 + 2mm GG13	4400		985	4380	6.95 10^{-9}
V	Corning 3384	2mm GG11	5500		870	5465	3.63 10^{-9}
photoelectric Vilnius							
U					400	3660	4.22 10^{-9}
B					1000	4405	6.40 10^{-9}
V					825	5425	3.75 10^{-9}
photographic							
	plate	filter					
U	103a-O	2mm UG2			630	3475	
B	103a-O	2mm GG13			1115	4385	
V_G	103a-G	2mm GG11			580	5440	
V_D	103a-D	2mm GG11			1400	5725	

(#) For an unreddened A0V star with V = 0.00. [178], pg. 50-54

ZERO POINT: The mean colors of the six unreddened A0 V stars α Lyr, γ UMa, 109 Vir, α CrB, γ Oph and HR 3314 are $U-B = B-V = 0.00$. [156]

PHOTOGRAPHIC VERSION: Bell, R. A. 1972, MNRAS 159, 357

SYSTEM ANALYSIS

REDDENING-FREE PARAMETERS [285], pg. 241

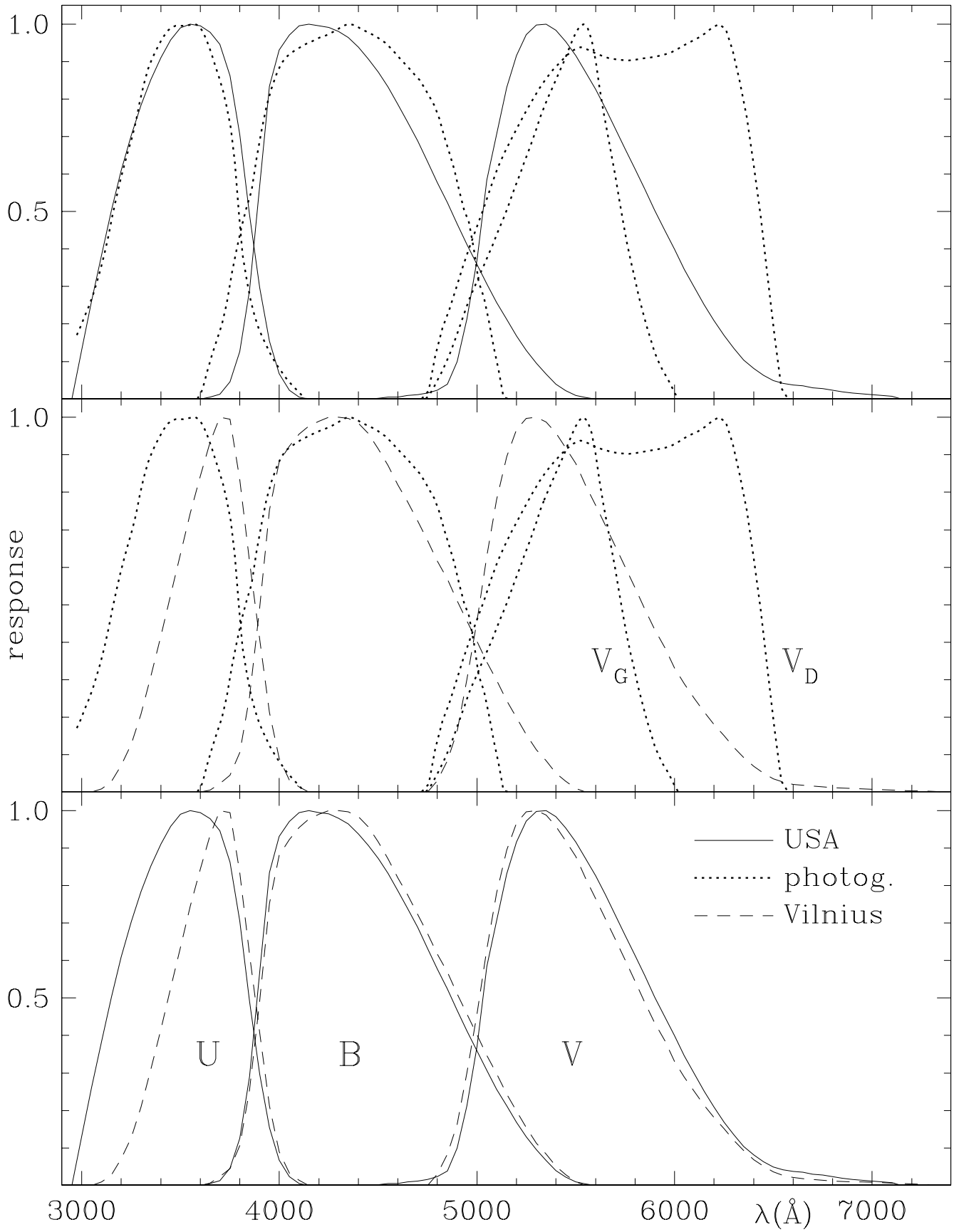
$$Q_{UBV} = (U-B) - [E(U-B)/E(B-V)]\,(B-V)$$

REDDENING RATIOS

$$E(U-B)/E(B-V) = 0.72 + 0.05E(B-V)$$ [285], pg. 227

$$A_U = 4.40\,E(B-V) \qquad A_B = 4.10\,E(B-V) \qquad A_V = 3.10\,E(B-V)$$ [258]

The photographic bands are derived from Fig. 1 of [29].



USA						Vilnius						Photographic					
U		B		V		U		B		V		U		B		V_G		V_D	
λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ	λ (Å)	ϒ
2950	0.000	3600	0.000	4450	0.000	3050	0.000	3600	0.000	4750	0.000	2975	0.171	3585	0.000	4740	0.000	4720	0.000
3000	0.131	3650	0.005	4500	0.002	3100	0.009	3650	0.006	4800	0.030	2995	0.195	3610	0.024	4760	0.011	4755	0.022
3050	0.260	3700	0.013	4550	0.005	3150	0.028	3700	0.023	4850	0.084	3015	0.220	3635	0.074	4780	0.030	4790	0.115
3100	0.384	3750	0.046	4600	0.005	3200	0.071	3750	0.045	4900	0.163	3035	0.246	3660	0.119	4800	0.049	4825	0.190
3150	0.502	3800	0.126	4650	0.009	3250	0.128	3800	0.106	4950	0.301	3055	0.275	3685	0.159	4820	0.070	4860	0.239
3200	0.609	3850	0.290	4700	0.012	3300	0.209	3850	0.254	5000	0.458	3075	0.307	3710	0.198	4840	0.093	4895	0.297
3250	0.703	3900	0.568	4750	0.016	3350	0.309	3900	0.492	5050	0.630	3095	0.344	3735	0.255	4860	0.118	4930	0.356
3300	0.784	3950	0.834	4800	0.023	3400	0.417	3950	0.752	5100	0.780	3115	0.387	3760	0.338	4880	0.144	4965	0.410
3350	0.852	4000	0.931	4850	0.039	3450	0.527	4000	0.881	5150	0.895	3135	0.436	3785	0.402	4900	0.174	5000	0.461
3400	0.911	4050	0.971	4900	0.100	3500	0.635	4050	0.923	5200	0.967	3155	0.486	3810	0.462	4920	0.205	5035	0.511
3450	0.958	4100	0.995	4950	0.213	3550	0.744	4100	0.955	5250	0.997	3175	0.536	3835	0.512	4940	0.236	5070	0.566
3500	0.990	4150	1.000	5000	0.371	3600	0.844	4150	0.977	5300	1.000	3195	0.583	3860	0.555	4960	0.264	5105	0.617
3550	1.000	4200	0.995	5050	0.548	3650	0.934	4200	0.990	5350	0.988	3215	0.625	3885	0.640	4980	0.290	5140	0.658
3600	0.995	4250	0.991	5100	0.705	3700	1.000	4250	1.000	5400	0.958	3235	0.661	3910	0.718	5000	0.314	5175	0.695
3650	0.978	4300	0.980	5150	0.831	3750	0.995	4300	1.000	5450	0.919	3255	0.698	3935	0.782	5020	0.338	5210	0.730
3700	0.946	4350	0.964	5200	0.916	3800	0.834	4350	0.997	5500	0.877	3275	0.743	3960	0.828	5040	0.362	5245	0.764
3750	0.862	4400	0.938	5250	0.972	3850	0.616	4400	0.984	5550	0.819	3295	0.793	3985	0.865	5060	0.387	5280	0.797
3800	0.705	4450	0.907	5300	0.998	3900	0.408	4450	0.958	5600	0.765	3315	0.840	4010	0.894	5080	0.412	5315	0.828
3850	0.492	4500	0.872	5350	1.000	3950	0.213	4500	0.916	5650	0.711	3335	0.879	4035	0.912	5100	0.438	5350	0.855
3900	0.297	4550	0.832	5400	0.984	4000	0.090	4550	0.871	5700	0.657	3355	0.907	4060	0.923	5120	0.464	5385	0.878
3950	0.154	4600	0.786	5450	0.954	4050	0.033	4600	0.820	5750	0.602	3375	0.928	4085	0.932	5140	0.490	5420	0.898
4000	0.067	4650	0.739	5500	0.916	4100	0.014	4650	0.775	5800	0.545	3395	0.949	4110	0.940	5160	0.518	5455	0.917
4050	0.023	4700	0.688	5550	0.872	4150	0.000	4700	0.723	5850	0.488	3415	0.968	4135	0.947	5180	0.546	5490	0.931
4100	0.005	4750	0.633	5600	0.826			4750	0.672	5900	0.434	3435	0.983	4160	0.953	5200	0.575	5525	0.938
4150	0.000	4800	0.578	5650	0.775			4800	0.617	5950	0.386	3455	0.991	4185	0.959	5220	0.603	5560	0.932
		4850	0.524	5700	0.722			4850	0.569	6000	0.331	3475	0.995	4210	0.965	5240	0.631	5595	0.923
		4900	0.467	5750	0.668			4900	0.511	6050	0.289	3495	0.995	4235	0.970	5260	0.659	5630	0.916
		4950	0.412	5800	0.613			4950	0.457	6100	0.250	3515	0.995	4260	0.976	5280	0.689	5665	0.910
		5000	0.359	5850	0.559			5000	0.402	6150	0.214	3535	0.997	4285	0.983	5300	0.720	5700	0.906
		5050	0.307	5900	0.503			5050	0.347	6200	0.181	3555	0.999	4310	0.991	5320	0.751	5735	0.904
		5100	0.257	5950	0.450			5100	0.299	6250	0.151	3575	1.000	4335	0.998	5340	0.779	5770	0.903
		5150	0.212	6000	0.399			5150	0.244	6300	0.120	3595	0.994	4360	1.000	5360	0.805	5805	0.905
		5200	0.168	6050	0.346			5200	0.199	6350	0.093	3615	0.978	4385	0.996	5380	0.829	5840	0.908
		5250	0.130	6100	0.297			5250	0.154	6400	0.069	3635	0.952	4410	0.988	5400	0.852	5875	0.911
		5300	0.095	6150	0.251			5300	0.113	6450	0.051	3655	0.922	4435	0.981	5420	0.876	5910	0.914
		5350	0.066	6200	0.209			5350	0.084	6500	0.036	3675	0.891	4460	0.975	5440	0.901	5945	0.918
		5400	0.040	6250	0.169			5400	0.051	6550	0.027	3695	0.858	4485	0.969	5460	0.926	5980	0.923
		5450	0.022	6300	0.135			5450	0.029	6600	0.021	3715	0.821	4510	0.960	5480	0.953	6015	0.933
		5500	0.009	6350	0.104			5500	0.010	6650	0.018	3735	0.779	4535	0.950	5500	0.977	6050	0.944
		5550	0.004	6400	0.081			5550	0.000	6700	0.016	3755	0.723	4560	0.937	5520	0.994	6085	0.954
		5600	0.000	6450	0.063					6750	0.014	3775	0.630	4585	0.923	5540	1.000	6120	0.963
				6500	0.049					6800	0.012	3795	0.494	4610	0.909	5560	0.990	6155	0.975
				6550	0.042					6850	0.011	3815	0.384	4635	0.895	5580	0.958	6190	0.990
				6600	0.037					6900	0.010	3835	0.319	4660	0.881	5600	0.902	6225	1.000
				6650	0.035					6950	0.009	3855	0.262	4685	0.866	5620	0.833	6260	0.987
				6700	0.030					7000	0.008	3875	0.220	4710	0.850	5640	0.767	6295	0.930
				6750	0.028					7050	0.007	3895	0.190	4735	0.829	5660	0.709	6330	0.849
				6800	0.023					7100	0.006	3915	0.164	4760	0.806	5680	0.655	6365	0.751
				6850	0.019					7150	0.005	3935	0.141	4785	0.783	5700	0.597	6400	0.623
				6900	0.016					7200	0.004	3955	0.121	4810	0.748	5720	0.531	6435	0.487
				6950	0.014					7250	0.003	3975	0.102	4835	0.701	5740	0.469	6470	0.326
				7000	0.012					7300	0.002	3995	0.085	4860	0.656	5760	0.415	6505	0.169
				7050	0.009					7350	0.001	4015	0.070	4885	0.612	5780	0.365	6540	0.029
				7100	0.007					7400	0.000	4035	0.056	4910	0.556	5800	0.318	6575	0.000
				7150	0.000							4055	0.043	4935	0.505	5820	0.274		
												4075	0.031	4960	0.471	5840	0.232		
												4095	0.020	4985	0.400	5860	0.192		
												4115	0.009	5010	0.312	5880	0.156		
												4135	0.000	5035	0.270	5900	0.124		
														5060	0.208	5920	0.098		
														5085	0.138	5940	0.076		
														5110	0.077	5960	0.058		
														5135	0.005	5980	0.040		
														5160	0.000	6000	0.017		
																6020	0.000		