

Modelling the Arterial Tree Using Bond Graph

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Table 1: Arterial Tree

Arterial Segment	Segment Number	Length, (10^{-3} m)	Radius, (10^{-3} m)	Elasticity, (10^6 Pa)	Thickness, (10^{-3} m)
Ascending Aorta	1	1	1.60	0.4	1.8
Aortic Arch 1	2	1	1.28	0.4	1.8
Aortic Arch 2	3	1	1.24	0.4	1.8
Descending Aorta	4	1	1.20	0.4	1.0
Thoracic Aorta 1	5	1	1.00	0.4	1.0
Thoracic Aorta 2	6	1	0.95	0.4	1.0
Abdominal Aorta 1	7	1	0.74	0.4	1.0
Abdominal Aorta 2	8	1	0.72	0.4	1.0
Abdominal Aorta 3	9	1	0.70	0.4	1.0
Abdominal Aorta 4	10	1	0.62	0.4	1.0
Right Common Iliac Artery	11	1	0.42	0.4	0.7
Right Internal Iliac Artery	12	1	0.29	0.4	0.6
Right External Iliac Artery	13	1	0.33	0.4	0.6
Right Deep Femoral Artery	14	1	0.21	0.4	0.5
Right Femoral Artery	15	1	0.30	0.4	0.6
Right Posterior Tibial Artery	16	1	0.12	0.8	0.3
Right Anterior Tibial Artery	17	1	0.23	0.8	0.3
Left Common Iliac Artery	18	1	0.42	0.4	0.7
Left Internal Iliac Artery	19	1	0.29	0.4	0.6
Left External Iliac Artery	20	1	0.33	0.4	0.6
Left Deep Femoral Artery	21	1	0.21	0.4	0.5
Left Femoral Artery	22	1	0.30	0.4	0.6
Left Posterior Tibial Artery	23	1	0.12	0.8	0.3
Left Anterior Tibial Artery	24	1	0.23	0.8	0.3
Brachiocephalic Trunk	25	1	0.66	0.4	0.9
Right Subclavian Artery	26	1	0.47	0.4	0.7
Right Common Carotid Artery	27	1	0.43	0.4	0.6
Right Brachial Artery	28	1	0.40	0.4	0.5
Right Radial Artery	29	1	0.14	0.6	0.4
Right Ulnar Artery 1	30	1	0.14	0.6	0.4
Right Ulnar Artery 2	31	1	0.14	0.6	0.4
Right Interosseous Artery	32	1	0.10	0.8	0.2
Left Subclavian Artery	33	1	0.48	0.4	0.7
Left Common Carotid Artery	34	1	0.43	0.4	0.6
Left Brachial Artery	35	1	0.34	0.4	0.5
Left Radial Artery	36	1	0.14	0.6	0.4
Left Ulnar Artery 1	37	1	0.14	0.6	0.4
Left Ulnar Artery 2	38	1	0.14	0.6	0.4
Left Interosseous Artery	39	1	0.10	0.8	0.2
Right External Carotid Artery	40	1	0.23	0.4	0.5
Right Internal Carotid Artery	41	1	0.27	0.4	0.4
Left External Carotid Artery	42	1	0.23	0.4	0.5
Left Internal Carotid Artery	43	1	0.27	0.4	0.4
Right Renal Artery	44	1	0.30	0.4	0.6
Right Segmental Renal Artery 1	45	1	0.16	0.6	0.4
Right Segmental Renal Artery 2	46	1	0.25	0.4	0.5
Right Segmental Renal Artery 3	47	1	0.19	0.4	0.5
Right Segmental Renal Artery 4	48	1	0.19	0.4	0.5

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Arterial Segment	Segment Number	Length, (10 ⁻³ m)	Radius, (10 ⁻³ m)	Elasticity, (10 ⁶ Pa)	Thickness, (10 ⁻³ m)		
Left Renal Artery	49	1	1	0.27	0.4	0.5	
Left Segmental Renal Artery 1	50	1	1	0.16	0.6	0.4	
Left Segmental Renal Artery 2	51	1	1	0.25	0.4	0.5	
Left Segmental Renal Artery 3	52	1	1	0.19	0.4	0.5	
Left Segmental Renal Artery 4	53	1	1	0.19	0.4	0.5	
Right Intercostal Artery 1	54	1	1	0.14	0.8	0.3	
Right Intercostal Artery 2	55	1	1	0.16	0.8	0.3	
Left Intercostal Artery 1	56	1	1	0.14	0.8	0.3	
Left Intercostal Artery 2	57	1	1	0.16	0.8	0.3	
Inferior Mesenteric Artery	58	1	1	0.20	0.4	0.5	
Superior Mesenteric Artery 1	59	1	1	0.38	0.4	0.6	
Superior Mesenteric Artery 2	60	1	1	0.34	0.4	0.6	
Superior Mesenteric Artery 3	61	1	1	0.31	0.4	0.6	0.6
Superior Mesenteric Artery 4	62	1	1	0.28	0.4	0.6	0.6
Superior Mesenteric Artery 5	63	1	1	0.26	0.4	0.6	0.6
Superior Mesenteric Artery 6	64	1	1	0.25	0.4	0.6	0.6
Superior Mesenteric Artery 7	65	1	1	0.23	0.4	0.6	0.6
Middle Colic Artery	66	1	1	0.14	0.6	0.4	0.4
Jejunal 3 Artery	67	1	1	0.16	0.6	0.3	0.3
Jejunal 5 Artery	68	1	1	0.16	0.6	0.3	0.3
Ileocolic Artery	69	1	1	0.20	0.4	0.5	0.5
Ileal 3 Artery	70	1	1	0.18	0.6	0.3	0.3
Ileal 5 Artery	71	1	1	0.18	0.6	0.3	0.3
Celiac Trunk	72	1	1	0.33	0.4	0.6	0.6
Common Hepatic Artery	73	1	1	0.27	0.4	0.5	0.5
Right Hepatic Artery	74	1	1	0.14	0.6	0.3	0.3
Left Hepatic Artery	75	1	1	0.12	0.6	0.3	0.3
Splenic Artery	76	1	1	0.22	0.4	0.5	0.5
Left Gastric Artery	77	1	1	0.15	0.6	0.4	0.4
Pancreatic Artery	78	1	1	0.06	0.8	0.2	0.2
Right Vertebral Artery	79	1	1	0.13	0.6	0.4	0.4
Right Posterior Communicating Artery 1	80	1	1	0.08	0.6	0.2	0.2
Right Posterior Communicating Artery 2	81	1	1	0.09	0.6	0.3	0.3
Right Posterior Communicating Artery 3	82	1	1	0.05	0.8	0.2	0.2
Right Middle Cerebral Artery	83	1	1	0.10	0.6	0.3	0.3
Right Anterior Cerebral Artery 1	84	1	1	0.10	0.6	0.3	0.3
Right Anterior Cerebral Artery 2	85	1	1	0.10	0.6	0.5	0.5
Left Vertebral Artery	86	1	1	0.13	0.6	0.4	0.4
Left Posterior Communicating Artery 1	87	1	1	0.08	0.6	0.2	0.2
Left Posterior Communicating Artery 2	88	1	1	0.09	0.6	0.3	0.3
Left Posterior Communicating Artery 3	89	1	1	0.05	0.8	0.2	0.2
Left Middle Cerebral Artery	90	1	1	0.10	0.6	0.3	0.3
Left Anterior Cerebral Artery 1	91	1	1	0.10	0.6	0.3	0.3
Left Anterior Cerebral Artery 2	92	1	1	0.10	0.6	0.5	0.5
Anterior Communicating Artery	93	1	1	0.07	0.6	0.1	0.1
Basilar Artery	94	1	1	0.17	0.6	0.4	0.4

